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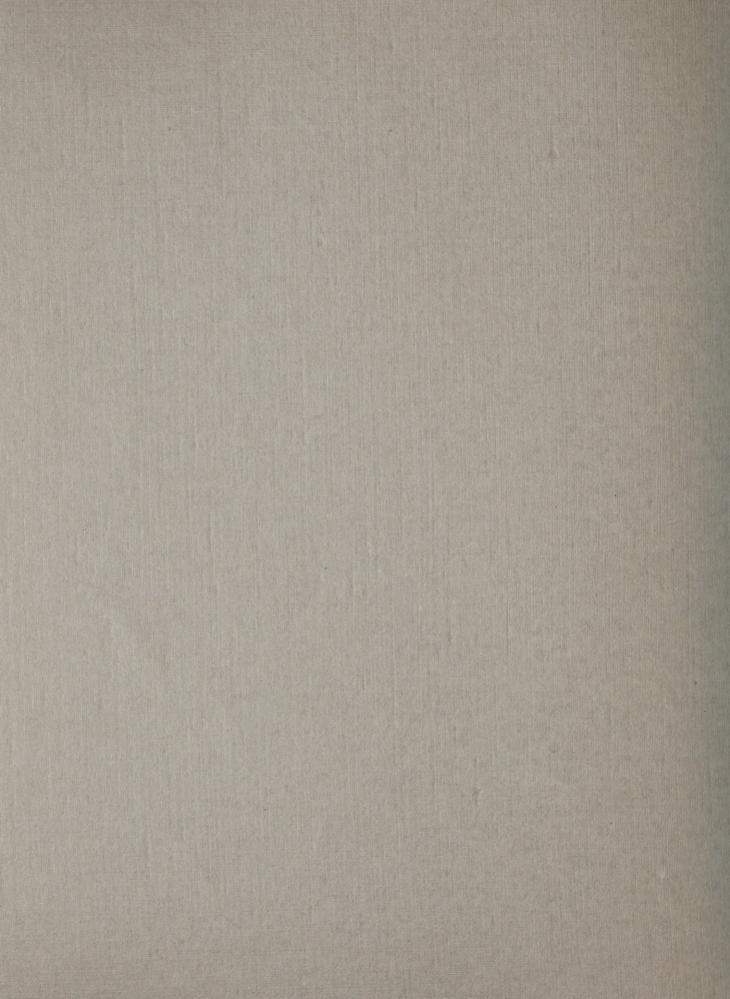
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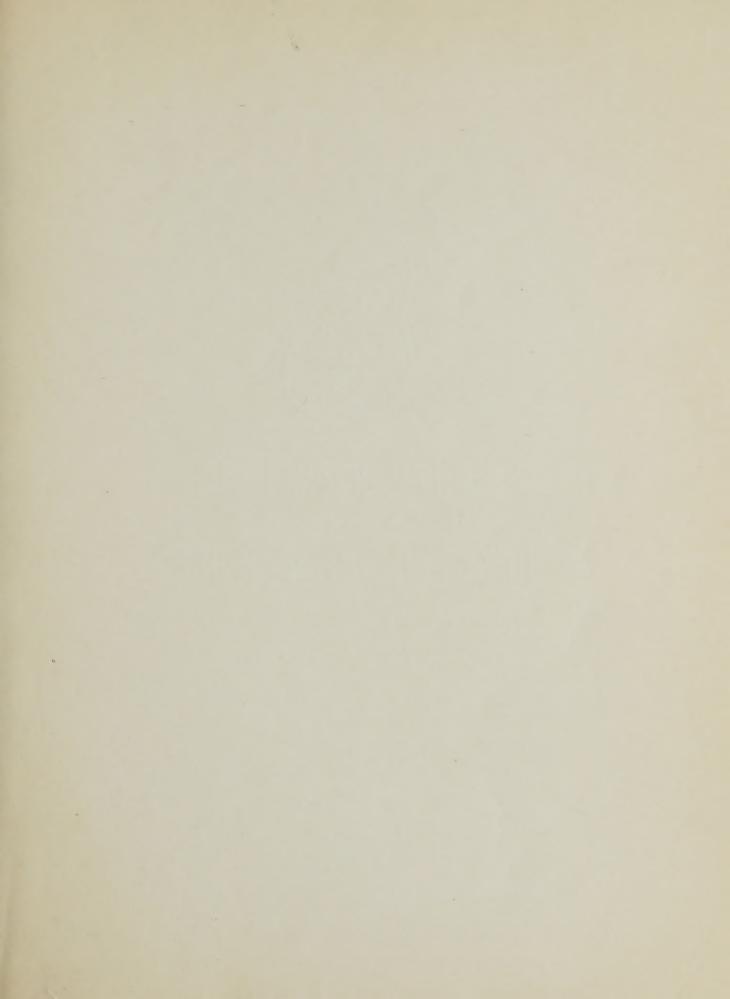
THE QUEENSTON-CHIPPAWA POWER DEVELOPMENT

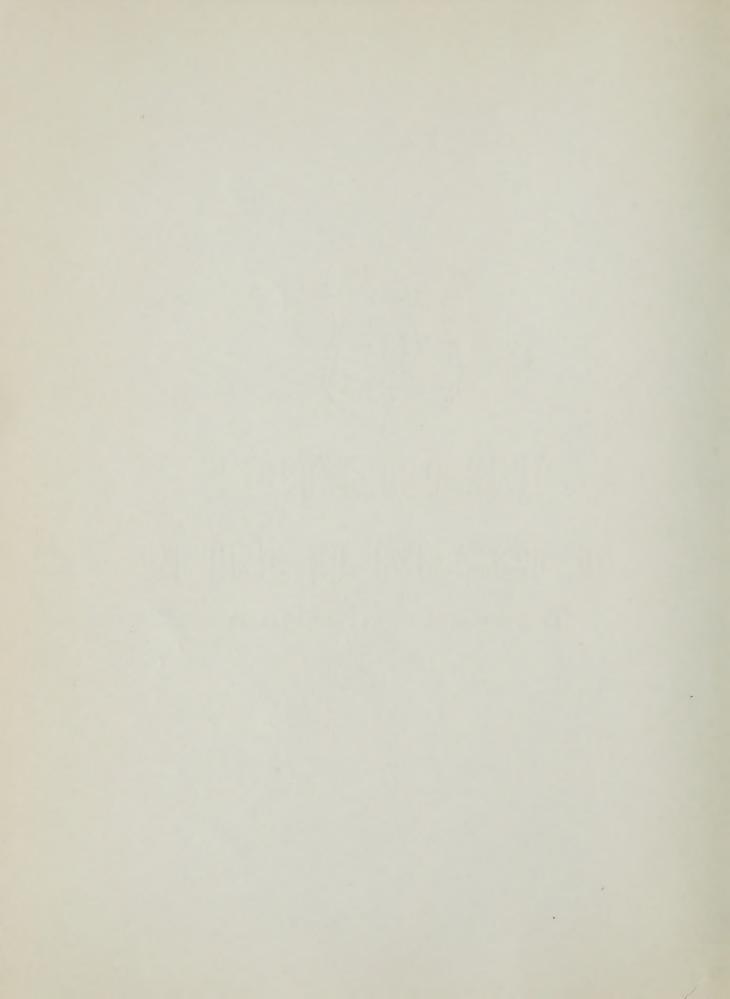
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VOLUME II—COST, CAPACITY AND OPERATION
VOLUME III—ESTIMATES AND APPROPRIATIONS
VOLUME IV—REASONS FOR INCREASED COST

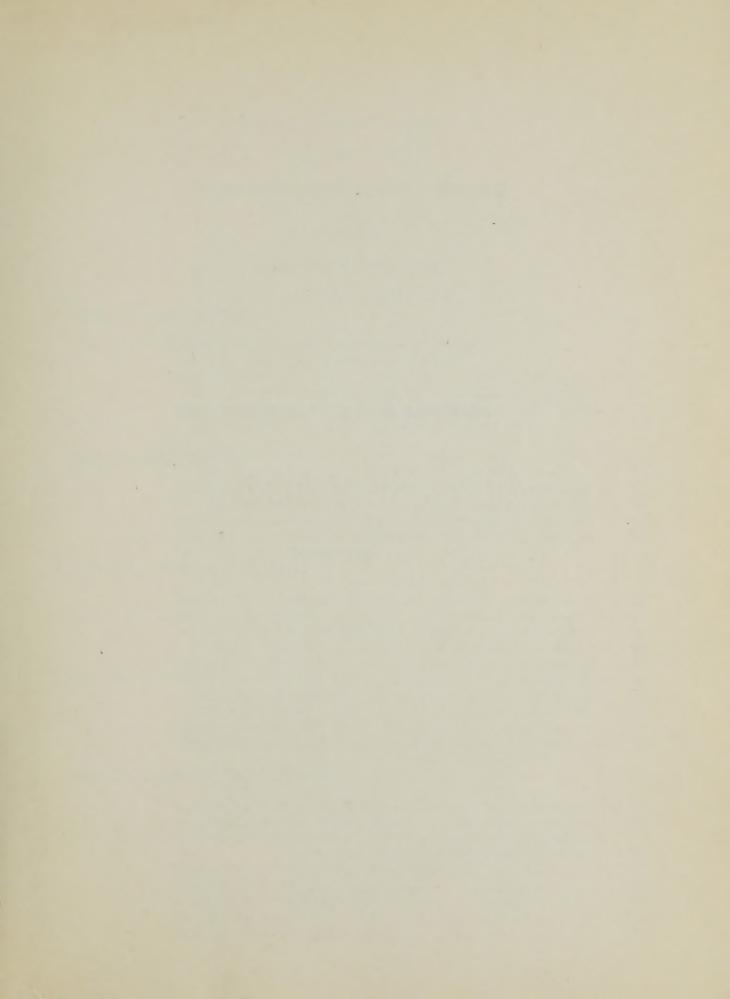
VOLUME III

JOSEPH H. W. BOWER
SECRETARY









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THE QUEENSTON-CHIPPANA MOUNT DEVELOPMENT

VOLUME III

ESTIMATES AND APPROPRIATIONS

PART VII - ESTIMATES

Section 29

GERERAL

The first question referred to this Commission by the Letters

"All estimates submitted from time to time to the Hydro-Electric Power Commission of Ontario for the Queenston-Chippawa Power Development, and also all estimates for the said work submitted by the said Commission to the Government of Ontario."

The records of the Hydro-Electric Power Commission in regard to estimates are voluminous. The word "estimate" has been used in two senses — in one it refers to the estimated cost of works in contemplation or under construction, and in the other to the requests to the Government for appropriation of money required from time to time. The entimates of cost may be based on unit prices for future work or they may be a combination of expenditures already made with the estimates of cost of future work added. As used in the second sense, namely, appropriation, the word refers to documents passing between the Hydro-Electric Power Commission and the Government annually, semi-annually or at other intervals to make known in advance the estimated financial requirements of the Commission for all works within the jurisdiction of the

Mark Electric section (Example)

THE RESIDENCE OF THE PERSON OF

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Commission during the stated period.

In ordinary business practice the making of an estimate is considered a most important matter. The engineer, architect or contractor when submitting an estimate on construction work knows that the client will regard it as a close approximation of the actual cost of the work in contemplation.

It often happens that the client uses the estimate to inform his banker of the liability he proposes to assume, and it is on the basis of such statements that the banker advances funds to finance the undertaking. If the estimate submitted is inaccurate and the actual cost runs far beyond the amount contemplated the clark and the banker may both become involved in a serious financial loss. Viewed from the standpoint of the contractor who is required in the ordinary routine of his business to submit tenders, the making of the estimates on which his tenders are based is a matter of such importance that on their accuracy largely depends the success or failure of his business. The sverage contractor works on a profit margin varying from 10% to 20%, and his estimate of cost must, therefore, be well within the margin allowed if profitable results are to be obtained. The contractor frequently finances his business on "accepted tenders", and, if the estimates on which these tenders are based are incorrect, financial support is withdrawn and is not easily renewed, for confidence in his methods and ability has been tells again study service on attalk blan in J. Mile appoints have bedestroyed.

The Commission in the construction of the Queenston-Chippews.

Power Development was in the unusual position of owner, angineer and con
tractor: three entities in one. The relationship of the Government to the

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mungido-mosement odd do moide --mos bas needigae , seaso do moideog (1 undertaking may be best understood by regarding it as the banker advancing funds to the Commission to meet the cost.

Briefly, the Commission, as owner, employed the services of its own officials in the first instance as engineers to report upon the feasibility and cost of the work, and in the second instance employed the same officials in the capacity of contractors to direct and carry out the work. The Commission, therefore, in dealing with the Government, was in a position of unusual responsibility, for in approaching its banker, the Government, it in effect guaranteed that the estimates prepared by its engineers would not differ greatly from the actual cost, and that the same officials, who were responsible for the estimates, had the ability, knowledge and experience to enable them to execute the work within the estimated cost.

Section 30

They have made and consentingly of employing and information that

BET DIATES OF COST

planting the bear and in supplication.

The first estimate of the (meenston-Chippswa Power Development, being known as No. 1, was for the purpose of indicating the feasibility and cost of the project them designed and studied. It was dated June, 1915. The last estimate is dated January 29th, 1923, and is a figure intended to indicate the total cost of the ultimate capacity of the project as now partly constructed, the whole being an evolution of the general type of project first reported upon. Between these two dates are many other estimates of cost, all relating in a general way to evolutionary stages of the general project and under the conditions existing from time to time. The earlier estimates relate entirely to work in contemplation, while the later ones

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have been based on expenditures already made; the later the estimate the greater the proportion of actual expenditure included in it. Fractically all of the estimates above referred to have been made by the engineers of the Commission or by consulting engineers and contractors engaged by them. E-2

WIF.

Our Consulting Engineer, Mr. Walter J. Francis, has submitted a report to this Commission entitled "Engineering Data, Chapter E - Costs, Analysis of Estimates, Parts I and II", which discusses in detail the various estimates prepared from time to time. On pages E-3 to E-16 of the above-mentioned report. Er. Francis submits a latter addressed to him, bearing date of January 29th, 1923, in which Mr. Gaby, the Chief Engineer of the Commission, sets forth in a connected way a statement in reference to the various estimates which have been prepared. Mr. Francis, in summarixing the matter, states as follows:

"For the make of convenience of comparison and reference, the various estimates on record, and referred to by Mr. Gaby, have been compiled into the following table in chronological order. together with a brief reference to the salient features thereof in order. Following the summary is a series of notes explaining the bases used in computations."

W.TW. K-16.

The tables referred to are included herewith as pages 162 and 163, and it is to a large extent on the figures given in these tables that the following discussion rests.

Estimate No. 1, dated June 23rd, 1915, signed by the Chief Engineer, was submitted to the Hydro-Electric Power Commission and the following are extracts from it:

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SUMMARY LIST OF ESPIRATES OF COST OF

	Data of Estimate	In	Fominal stallation	<u>Appro</u>	Capacity ximately . Force-	Total Amount of Estimate in Dollars	Approx. Capital Cost per H.P.	Basis of Estimate
No. 1.	June	25,1915	100,000	5,550	7047118	10,410,255	2064	A
	January	5,1916	200,000	6,550	varying	13,149,603	65	3
	January	12,1917	100,000	6.550	varying	12,490,000	126*	C
No. 2,	November	27,1917	300,600	10,000	300,000	24,516,815	61	D
	e3		200,000	10,000	300,000	21,025,559	105*	3
	9%		150,000	10,000	300,000	18,985,997	126*	7 *****
	qy		300,000	(10, ab)	Z00,000	29,121,773	97	G
	*9		500,000	10,000	360,000	51,005,814	103	E ****
	\$*t		200,000	10,000	300.000	27,977,280	140*	I
	12		150,000	10,000	300,000	26,297,387	175*	3 ****
	8 4		300,000	10,000	300,000	25,539,685	68	E
	85		200,000	10,000	300,000	22,560,081	113*	L ****
	66		150,000	10,000	300,000	20,895,886	140*	M ****
	Pobracy	8,1918	300,000	10,000	300,000	24,000,000	50	N
No -2-A	James y	3,1919	300,000	15,000	500,000	25,102,915	84*	0 ****
	Pebruary	25,1919	300,000	15,000	500,000	25,000,000	63*	2 ****
	Late in	1919	300,000	15,000	500,000	27,026,635	90*	Q
	Angust .	7,1920	258,000	15,000	500,000	66,425,418	257*	
	韓		369,000	15,000	500,000	76,636,931	197*	S ****

QUEENSTON- CHIPPANA POWER DEVELOPMENT,

300	Type of Project	Reference Page or Appendix	Remarks
	Canal		Preliminary. See details.
******	Canal	II	Based on Matimate No. 1. See details.
*******	Canal Pa	age K-9	Letter to Sir William Hearst saying estimate would be increased 15% or possibly 20%. For complete 300,000 horse-power installation.
	Canal	IV	Based on Estimate No. 2. See details.
*****	Canal	A	Based on Satimate No. 2. See details.
*****	Canal	AI	Based on Estimate No. 2, using Douglass unit excavating
*****	Tunnel	AII	Basel on Matimete No. 2. See details.
******	Tunnel	AIII	Based on Estimate No. 2. See details.
******	Tunnel	I	Based on Estimate No. 2. See details.
******	Tunnol and Canal	X	Based on Estimate No. 2. See details.
: (海洋市協働市市	Tunnol and Canal	XI	Based on Estimate No. 2. See details.
******	Punnel and Capal	XII	Bused on Estimate No. 2. See details.
**** ********************************	Consi R		Letter to Sir William Hearst caying expenditure will be from \$17,000,000 to \$24,000,000.
	Camal	XIII	Based on Estimate No. 2. See details.
*****	Canal Pa	150 K-9	Lotter to the Honograble T. W. NoGarry saying expenditure will be from \$24,000,000 to \$25,000,000.
	Canal Pa	rile K-10	Present Intake added. See details.
* * * * * * * * *	Canal	XIV	Cooper Matinate, N.B.P.C. design.
*****	Canal	XIV	Cooper Estimate, H.B.P.C. design.

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SUMMERY LIST OF SSTIMITES OF COST OF

Date of		Date of Installation Cu.		Canal Capacity Approximately Total importance of Satime per Sec. power in Bolla		Approx. Capital Cost par H.P.	Basis of Estima	
No.2-A.August	7,1920	258,000	15,000	500,000	60,862,892	236*	2	
it		869,000	15,000	500,000	72,216,735	186*	U	
#8	`	511,000	20,000	500,000	71,988,626	231*	V	
17		549,000	20,000	549,000	88,930,506	162	W	
September	30,1920	250,000	15,000	500,000	43,271,759	173*	X	
17		450,000	15,000	500,000	52,271,759	116*	¥	
P\$		250,000	22,000	660,000	46,971,759	188*	2 ****	
49		480,00	22.00Y	660,000	85,971,759	124*	AA	
99		660,000	22,000	660,000	67,871,759	103	BB	
December	13,1921	300,000	15,000	500,000	54,275,593	161.	cc	
Pebruary	10,1922	300,000	15,000	500,000	65,365,603	210*	DD	
January	27,1923	300,000	15,000	500,000	31,270,628	104*	88	
**		300,000	10,000	300,000	26,015,998	87	77	
January	29,1923	300,000	15,000	500,000	64,370,180	214*	GG	
糖		500,000	15,000	500,000	74,677,367	149	MH	
99		550,000	18,000	550,000	80,729,014	147	II	

Note: The figures in the column headed "Approximate Capital Cost per Horse-power" are arrived at by dividing the "Total Amount of Estimate in Dollars" by the "Nominal Installation, Horse-power". In cases where the installation is only part of the capacity of the development as a whole the figures in the column headed "Approximate Capital Cost per Horse-power" are marked with a star, thus *, and are not comparable amongst themselves nor with those not so designated with a star. It will thus be seen that there are eleven cases on a corresponding basis.

QUESTION CHIPPAWA POWER DEVELOPMENT (continued)

Service of the last			
	Type of Project	Reference Page or Appendix	Remarks
***	Canal	XIV 11	Cooper Estimate, Cooper modified design.
****	Canal	XIV	Cooper Estimate, Cooper modified design.
***	Canal	VIX	Gooper Estimate, Cooper modified design:
****	Canal	XIA	Cooper Estimate, Cooper modified design.
	Canal	XY	Stuart and Kerbangh Estimate. Combination of Expenditures and Estimates.
****	Canal	XV	Stuart and Kerbangh Estimate. Combination of Expenditures and Estimates.
***	Canal	XV	Stuart and Kerbaugh Estimate. Combination of Expenditures
***	Ganal	NAME OF TAXABLE PARTY.	Swar and Estimates. Combination of Expenditures and Estimates.
****	Canal	ZV.	Stuart and Korbaugh Satimate. Combination of Expenditures
***	Canal	XV	Stuart and Kerbangh Estimate by additions to former Estimate.
****	Canal	Page K-12	Submitted to the Honourable E. C. Drury. See details.
****	Canal	XVI	Project as built, using 1916 unit prices. See details.
	Canal	XVII	Project as designed in 1917, using 1916 unit prices.
****	Canal	XAIII	Five units complete. Combination of Expenditures and
	Canal	I XIX	Nine units complete. Combination of Expenditures and
****	Canal days	otatat fili. Anne vo ti 🗰	Ten units complete. Combination of Expenditures and Estimates.

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"In compliance with the instructions of the Commission I have carefully investigated the power conditions on the Hiagara Peninsula, and am pleased to submit a preliminary estimate devering the development of 100,000 hepe at the queenston site." · ·

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"We have estimated that the completion of the above works will cost \$10,500,000.00, or an estimated cost per hap. of \$105.00 for 100,000 h.p. The estimated annual charge on the above expenditure amounts to \$944,600.00 or \$9.44 per hap. This capital expenditure includes, in addition to that required for 200,000 h.p. development, the necessary equipment in the power house and head works for an extension to 300,000 h.p."

"The approximate cost for 200,000 h.p. will be in the neighborhood of \$70.00 per h.p. with an angual charge of less than definition that the size regulary appearance in the course of the course

IN REAL PROPERTY AND PERSONS AND PERSONS ASSESSED.

P.H. Pile Sx. 38

In evidence the Chief Engineer of the Cosmission stated:

published May, 2023, No. Woley Statistics Street, and American

"You see, our first and projection was 6,500 second feet. which would generate approximately 200,000 horse-power. Je were purchasing more right-of-way than was necessary, so that additional canal could be constructed when required."

for Alberthalor the Profess are the temperature-Collegeous Associations

BY. 4283

And later:

"As a matter of fact, the plans provided for extensions not only to 300,000 but up to 500,000 (horse-power)."

THE PERSONS HIS ASSESSMENT OF PERSONS HER DESCRIPTION OF THE PERSON NAMED IN

TO . 4284

On September 13th, 1915, a report signed by Sir Adam Book was submitted to the Premier and Cabinet Council of Ontario. The following are extracts therefrom:

THE REAL PROPERTY AND ADDRESS OF THE PARTY AND THE PARTY A

"Careful surveys have been made of this Queenston-Chippewa scheme of development with detailed explorations of earth and rock strata and other engineering date necessary to enable estimates to be prepared of the cost of the development.

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"It was found that on the basis of an ultimate 300,000 h.p. capacity for the permanent works, and with 100,000 h.p. equipment installed, the development could be made for \$10,500,000.00 with an annual charge of approximately \$944,600.00 per annual including operation, interest, sinking fund, maintenance and all other operating charges, or an equivalent of \$9.44 per h.p. per annual for 100,000 h.p. without depreciation and sinking fund, the annual charges for 100,000 h.p. would be \$7.00 and for 75,000 h.p. - \$9.20.

"Estimates were also prepared to cover capacities up to 200,000 and 800,000 h.p. which indicate that 200,000 h.p. can be developed at a price not exceeding \$7.00 and 300,000 h.p. at a price not exceeding \$6.00 per annum including interest, sinking fund and depreciation charges."

"We estimate that it will require approximately three years to complete the works at the Queensten-Chippawa development, ready for operation. Immediate action is therefore necessary to enable the Commission to take advantage of this excellent proposition and permit of their delivering power at the earliest possible data to take care of the requirements of the Fiagara System."

Two estimate that, providing construction is immediately decided upon the money requirements for 1916 will not exceed \$500,000; in 1917 - \$5,000,000; in 1918 - \$5,000,000; and the remainder in 1919 and 1920.

P.E. Pilo Ex. 3.

On October 6th, 1915, the Prime Minister erote Sir Adam Beck asking for further information covering the scheme, one of the requests being for:

"Revised figures as to the amount of money required for the proposed development in each year until its completion. I understood yesterday that the engineers had revised the estimate of the amounts required since the report I have was received."

P.M. File

Sir Adam Book replied to this letter on October 35th, 1915,

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"The Engineers of the Commission have confirmed their estimates by actual data secured in the field and consider that the money requirements for 1916 will not exceed \$500,000.00; for 1917 \$3,000,000.00; and for 1918 \$5,000,000.00. The remainder in 1919 and 1920."

P.M. File

On December 5th. 1915, the Commission wrote the Premier impressing the necessity of immediate action in respect of the development. P.H. File Ex.15 Ev. 4299.

On April 24th, 1916, the Commission wrote the acting Prime
Ninister urging that they be allowed "to proceed with the work, as provided for in sub-section (a) and (b) of Section 3 of an Act respecting
the Public Development of Water Powers in the Vicinity of Niagara Falls....
Also the approval of the plans and report submitted by the Commission and
on file with the Government" P

P.E. Pile Ex.22.

At the hearing with regard to the letter quoted above, Mr. Gaby stated: No. 200 R. P. Sanda Mark Mr.

"I have never been able, up to this date, to identify the plans that were submitted with a report provious to April 24th, 1916, but those plans were in our possession, and correspond with the estimates that were prepared on June 23rd, 1915."

3V.

On April 27th, 1916, assent was given to "An Act respecting the Public Development of Water Power in the Vicinity of Riagara Falls" (6 Geo. V. Chapter 20), commonly known as The Ontario Riagara Development Act of 1916, or the Act of 1916. This Act empowered the Commission to proceed with the Queenston-Chippawa Development.

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On December 12th, 1916, the Prime Minister wrote the Honourable
1. B. Luons, for certain information with regard to the Development, and
the letter was forwarded to the Commission by Mr. Lucas.

P.M. File

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The following, along with other information, was requested by the Prime Minister:

- l. "Estimate of the time necessary to complete the works and have same in operation."
- 2. "Total estimate of cost of the work and the amount it is intended to expend in each year."
- 3. "The amount of water that will be drawn through the canal when completed and the amount of horse-power same will develop."

On January 12th, 1917, the Secretary of the Commission replied to the extracts given from the Prime Rimister's letter above, as follows:

- 1. "The outside estimate of time required to complete the development is estimated to be three and one-half years, but if the work is done directly by the Commission, with heavy electrically driven tenstruction plant, it is expected that the work can be done in three years or less."
- P.M. File Er.47
- 2. "The total estimate of the cost of the work for 100,000 h.p. installed is \$10,410,000. The total estimate for the cost of 200,000 H.P. installed is \$13,215,000. Recent advances in the cost of Hydro-Electric machinery indicate that it will be necessary to increase these estimates 15% up to a possible extreme maximum of 20%. As against this, however, it may be mentioned that both of these estimates include an item of 25% for engineering and contingencies, which it is expected will absorb the greater portion of this advance in the cost of machinery, more especially in view of the economies which are sure to be effected by the Commission as a result of doing the work themselves."
- 3. "The canal is designed to carry continuously 6.500 cubic feet of water per second at the lowest stage of water in the Hiagara River. This amount of water will produce 200,000 H.P."

The following is an extract from the evidence given by Mr. Gaby in connection with this letter:

2.- And on the question of cost, you close by referring back to the reports of 1915, the report of September 15th, 1915, which is already in, and the letter of Outober 5th, 1915?

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Tes. Yes.

- Q.- And still stand by those estimates of the amount required osch year?
 - A. With the qualification that prices had increased, and we expected, by economies, to reduce them and, as a matter of fact, probably we had prepared estimates in the meantime.

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eighteen months after the first estimate had been submitted to the Government, the Commission was still using as a basis the unit costs contained in the Chief Engineer's report dated June 23rd, 1915, and firmly maintained that, though costs in respect of labour and material had advanced and that the costs would probably increase 16 per cent. to a possible extreme maximum of 20 per cent. the greater portion of the advance.

It is quite evident that the Commission was fully aware of the increase that had taken place, and at that time the conditions indicated that a further increase might be expected in the future. The Commission chose, however, to advise the Government that the estimates submitted by it were wholly adequate and that substantial economies would be effected by the Commission doing the work itself. As a matter of fact, the allowance by contractors of a substantial contingency percentage is not unusual under normal conditions and if there was good reason for a contingency item in the first estimate, the necessity existed to a greater extent under the conditions provailing in 1917.

The result was that instead of leaving a margin of safety in the figures than submitted to the Government, the estimates had been re. ..

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duced to a point, which, in our opinion, was considerably less than actual costs prevailing at that time, with nothing provided to cover unforeseen conditions which might arise.

In our opinion, the advice given by the Commission to the Government at this time was not based on sound judgment and misled the Government as to the probable cost of the project.

militarities windows in the Alightfa-risks requirement for the power.

The information in the hands of the Government at the beginning of the year 1917 was contained in the letter already mentioned bearing date of January 12th, 1917, sent to the them Premier, Sir William Hearst. In short, this letter informed the Government as follows:

"The total estimate of the cost of the work for 100,000 H.P. installed is \$10,410,000. The total estimate for the cost of 200,000 H.P. installed is \$13,215,000."

Our Consulting Engineer, in referring to the basis on which the estimate for 100,000 horse-power was arrived at, states as follows:

"Generally the figures refer to an installation of 100,000 horse-power in hydraulic and electrical machinery, with provision for an ultimate development of 300,000 horse-power for the whole project, with certain minor exceptions. There was protection against ice only at Chippewa; no dredging in the Welland River; dredging between Montrose and the entrance of the rock canal sufficient for the 100,000 horsepower installation; permanent control works at the entrance of the rock canal; rock canal with a capacity for 300,000 herse-power installation; right-of-way for 300,000 horse-power installation; no regulating flume excavation; no artificial storage: highway and railway bridge construction for 300,000 horse-power installation; substructure and superstructure of ocreen house for 300,000 horse-power installation; cranes in screen house for 800,000 horse-power installation; service ducts for 600,000 horse-power installation; penstock or shaft provision for 100,000 horse-power installation; excavation only for penstocks for 500,000 herse-power installation;

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ice shaft for 600,000 horse-power installation, substructure of power house and tailrace for 300,000 horse-power installation; excitation complete for 600,000 horse-power installation; superstructure of power house for 100,000 horse-power installation; electrical equipment for 100,000 horse-power installation, including cranes for 600,000 horse-power; and switching equipment for 12,000-volt apparatus in the power house."

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In referring to the basis on which the estimate for 200,000 horse-power was made, he states that this estimate was similar in all respects to the estimate for 100,000 horse-power installation.

"excepting that the hydraulic and electrical installation, together with its essential accessories, was for 200,000 horsepower instead of 100,000 horse-power installation. It involved also dredging in the Welland River to the amount of
\$224,000 and in the earth section of the Canal to the amount
of \$120,250."

WJF.

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definitely contemplated the future enlargement of the undertaking to a capacity of 300,000 horse-power and a possible later increase to a capacity of 600,000 horse-power. The estimate propared by the Chief Engineer in that year provided for the construction of the rock section of the canal, the purchase of sufficient right-of-way, the building of bridges, the substructure and superstructure of the screen house and the foundation of the power house and excevation of the tailrace, all for a capacity of 300,000 horse-power. Other items such as cranes, service tunnel, exciter penstock, etc., were estimated for a final capacity of 600,000 horse-power.

On April 12th, 1917, assent was given to "the Ontario Niagara Development Act, 1917". In the following month actual operations were commenced by Shovel No. 7 at Bosman's Gully on May 10th. The first work train service commenced one week later on May 17th. On June 1st, Shovel

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No. 5 was put into operation on the construction of the railway yards and in September, the small steam shovel, No. 7, was purchased from the head Construction Company after four months' service on a rental basis. During this same month the clearing of the power house site was commenced. It was not until the month of December that the first electrical shovel commenced to operate. Progress reports show that a very small amount of work was done thring this period on the actual construction of the canal, although constituently progress was made in the construction of the service railway and service railway yards.

While construction work was in progress the engineers of the Commission continued to make engineering studies of the project as a whole. In February, 1917, Mr. R. O. Jahrson. Consulting Engineer of New York, submitted a report dealing with the hydraulic characteristics of the rock section. During June, 1917, the engineers of the Commission commenced a study to determine the economic velocity in a concrete lined canal. It is apparent, therefore, that the engineers of the Commission at this time had conceived the idea of lining the canal with concrete, though such a procedure apparently had not been contemplated in the original estimates submitted. In July, detailed study was given to the question of the most economic rock section for the waterway. In September, a report was received from Er. A. C. Douglass setting forth the probable cost of rock and earth excavation.

The various studies and investigations that had been carried on during this year took definite form on December 26th, 1917, when an estimate known as Estimate No. 2 was completed by Er. Acres. Estimate No. 2 was for a complete 500,000 horse-power installation with a canal capable

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of carrying 10,000 cubic feet per second at a cost of \$24,316,815. Insofar as we have been able to learn no reference is made in the Einutes of the Commission regarding the presentation of this estimate to the Commission until April 19th, 1916, and the Minute on that date simply shows that the report was considered and ordered to be filed. It is clear, however, that instructions had been given to Mr. Acres to proceed on this enlarged scheme of development some time prior to the 19th of April, 1918, the date of its submission to the Board. Mr. Acres states that they were irrevocably committed to this larger scheme of development as early as March 16th, 1918, when electric Shovel No. 1 was put into operation.

In speaking of the enlarged scheme of development, Er. Acres was asked on what date actual work on the cenal was commenced, and he replied as follows:

the wholes, is always by the decision of the group had been more

"The best and most efficient (way) to fix that day would be by the date on which the first shovel went into operation."

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Later Mr. Acres states as follows:

"Shovel No. 1, first large electric shovel commenced in canal cut on March 16th. So March 16th might be considered the date upon which we were irrevocably committed to a design involving the removal of earth and rock to an extent greater than was necessary for 100,000 horse-power."

- Q .- Yes, and the date on which you were irrevecably committed to a development of what capacity?
- A.- 10,000 second feet. You see, our slope stakes and our line of grading for that shovel cut, were based on the assumption that a 10,000 second foot waterway was going to be built with the help of that shovel.

Our Consulting Engineer, in lisoussing the basis on which Estimate No. 2 was made, states that it was for a project with an installa-

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tion of 300,000 horse-power in hydraulic and electrical equipment. It involved a canal capacity throughout for 300,000 horse-power. He states that in the general plan and layout the basis of this estimate corresponds with the basis used for the first estimates made, with the modifications that the angineers of the Commission added as a result of their studies during the interval between Satimate No. 1 in 1915 and Matimate No. 2 in 1917. The unit price used for earth excevation in Matimate No. 2 was 27g per cubic yard and for rock excavation 98g per cubic yard.

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It will be noted from pages 162 and 163, on which a summary of all estimates made is submitted, that various other estimates are listed thereon under date of November 27th, 1917. These various other estimates are all for other plane of development based on Satinate No. 2, the one referred to above.

As stated, a change in the design of the canal had been under consideration during the summer of 1917, and it is probable that this change was definitely decided upon following an agreement to purchase the Ontario Power Company on April 12th of that year. On page 6 of the estimate the following paragraph appears:

"The taking over of The Ontario Power Company interests by
the Commission gave rise to the possibility of being able.
Within a reasonable time, to make use of 10,000 second
feet of water in place of the 6,500 second feet previously
considered available. The canal was therefore entirely
re-designed for 10,000 second feet in accordance with Er.
Johnson's refined method, and in general accordance with
the recommendations made by him in connection with the
6,500 second feet canal."

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In reference to the basis on which Estimate No. 2 was made.

Mr. Acres in his evidence described it as

".... a completely new estimate compiled on the basis of much fuller and more complete data than we had at the time the original estimate No. 1 was made."

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Again; in the report he states:

"An regards estimates of capital cost, it is to be noted that the tremendous advance which has taken place during the period of the war in the cost of labor and material has necessitated a very material increase in all estimates made during the pre-war period. Fortunately, for reasons hereunder explained, this statement does not hold for the two main items of cost in connection with the scheme, as a whole: namely, the cost of earth and rock excavation in the camal."

p.9.

"In compiling the above estimate proper consideration has been given to recent and probably others advances in the cost of machinery, labor and saterials, and each separate item of the estimate has been figured on a safe basis in regard to quantity and unit cost. Finally to the total thus derived, an allow-ance of 326% has been added for engineering and contingencies and interest during construction, making in all a gross total of \$24,317,000.00 for 300,000 electrical horse power installed."

p. 12.

as far as we can ascertain the Commission did not formally anthorise the Chief Engineer to proceed with the enlarged development although it is apparent that the matter was discussed from time to time. Mr. Pepe, Secretary of the Commission, in giving evidence before us, was not able to show any reference in the Sinutes other than the Item referred to above, namely, under date of April 19th, 1918, which Sinute simply shows that the report was discussed and ordered to be filed.

Purthermore, there is no documentary evidence so far as we can learn which shows that the Commission had taken the matter up with the Government or advised the Government of its intention to increase the

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Development at an increased expenditure of nearly \$14,000,000 until the Prime Minister asked for information on January 31st, 1918.

One item in the request read as follows:

"Power to be obtained from Chippawa-Queenston Development, ospital outlay, and when power will be available."

Ex. 14.

To this the Secretary of the Commission replied on February 5th, 1918, as follows: Capacity of ho. Com pasts fo

"Present plans and specifications for power canal provide for 300,000 h.p. and station and power house installations of capacity from 100,000 to 300,000 h.p. at an expenditure of from \$17,000,000 to \$24,000,000. Expected to be available by the end of 1920." At almost the time page mounts may be purposed by

Witte 14.

The Minute which read in part, "The combined report of the Rydraulic and Blectric Department to Chippaws Development was presented and considered by the Board", was dated April 19th, 1918, so this letter to the Prime Minister was written apparently two months before the matter was officially presented to the Board.

Sir William Hearst in giving evidence before us in commection with his letter above referred to was asked if he could recall the occasion of his request for information. His reply was as follows:

"I have not just the occasion in mind, but it was my practice when the Session was coming up to get an estimate I have no doubt we wanted to have a specific report in writing from the Commission, or from some authorized officer of it, as to what the situation was."

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THE RESIDENCE AND AN ADDRESS OF LOSS LABOUR SEE AND ADDRESS OF THE PARTY OF THE PAR Our investigations have failed to disclose any further correspondence between the Commission and the Government on the subject of the increase in the capacity of the Development, but in view of the fact that Mr. I. B. Lucas was a Commissioner as well as a Member of the Government

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at the time, it would appear probable that the Government was aware of the increase in expenditure contemplated by the Commission. At any rate there is nothing to show that the Government opposed it.

The Commission, therefore, proceeded with the construction of the works having definitely in mind the immediate development of 300,000 horse-power and a canal capacity of 10,000 cubic feet per second at an estimated cost of about \$24,000,000.

puring 1918 the Commission's engineers continued to study refinements in their design. In June of that year models were installed at
Dufferin Islands for the study of the intake design. The first experiments
carried out in connection with these models were completed in October of
the same year.

been retained, and a report was submitted by him in January, 1919, on an intake with a capacity of 15,000 cubic feet. Shortly after this, an estimate now known as Estimate No. 2-A dated January 3rd, 1919, was made by the Commission's engineers, the details of which were based on Estimate No. 2. The estimate provided for the additional cost of lining the canal with concrete and providing extra depth in the waterway. The report was presented to the Commission on March 25th, 1919, and showed an additional cost of \$786,100.00 bringing the total cost of the project as then contemplated up to \$25,102,915.

Briefly, Estimate No. 2-4 involved works having a nominal installation of 300,000 horse-power, a canal capacity of 500,000 horse-power, AN THE TIME IT SHIP AND ADDRESS OF THE THE THE THE THE SHIP AND ADDRESS OF THE TRANSPORT OF THE THEORY AND ADDRESS OF THE THEORY ADDRESS OF THE

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and a flow of 15.000 cubic feet of water per second. The Commission's engineers used the total amount of Estimate No. 2 as the bacis for Metimate of the root, he side or on nother or each feel had been No. 2-4, adding to the total of No. 2 extra estimated expenditures of \$786.100, covering additional excavation, the lining of the canal with from the above to be the life the free for the ball on though that has concrete, and so forth. While the esti ated cost of the additional rock another at the mean atte was related in the anti-most on excavation shown in No. 2-4 was increased from 96% to \$1.00 per yard, twentyfour of the twenty-five million dollars making up Estimate No. 2-A consisted of the figures used for Estimate Bo. 2 dated December 26th, 1917, about twelve months earlier, and it is interesting to note that the unit prices for earth and rock excavation used for Estimate Ho. 2 in 1917 were lower than those used in Estimate No. 1 made in 1915. This reduction was apparently made because of increased quantities and the type of equipment which they proposed to use. We will discuss this reduction here fully is a later section.

In reference to this particular matter the following is an extract from the ovidence of Er. Acres:

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THE RY DESIGNATION OF PERSONS ASSESSED. NO. PROPERTY AND ADDRESS.

- Q .- Well, does this fairly represent, in your opinion, the total estimated cost of the work at that date?
- A.- You, sir, it did.
- Q-- At that date it did? (January, 1919)
- A .- Oh, yes.
- Q .- And that is the work, as finally constructed, except the change in the intake?
- A .- That covers the outstanding changes . . . The outstanding changes in design are the ones that have been taken up.

And later at the hearing from the same witness:

Q.- Then, just to make this point absolutely clear, so that there will be no misunderstanding, had any change taken place in the conditions between the date you made Estimate No. 2 and the 3rd of January, 1919, which would lead you to revise Estimate No. 2?

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A .- No. sir. I still considered that the contingency we had provided in Matimate No. 2 was sufficient to cover the cost of the work, in view of the amount of work that had been done up to this date.

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From the above statement by Mr. Acres it will be noted that the engineers of the Commission were relying largely on the contingency amount which had been provided in Estimate No. 2 to cover any deficiencies or increase in cost that had occurred prior to January, 1919.

On February 20th, 1919, the Honourable T. W. Ecgarry, Provincial Treasurer. Wrote officially from the Parliament Buildings to the Beoretary of the Cornission as follows: harboard

"Would you please fornish me not later than Saturday of this week, with a detailed estimate of probable expenditures for the current fiscal year. I am endeavoring to prepare material for my budget, which will be delivered early in the Session, and it is quite impossible for me to complete it till I have a statement from your Commission.

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"I would also like a statement showing how much money has been expended on the Chippens Development up to the present time. and the estimated cost of its completion. I would also like a statement showing what horse-power will be developed at that cost.

"You will quite appreciate the fact that I will probably be asked a number of questions when delivering the budget, and I wish to be in a position to reply to them."

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The Honourable Mr. McGarry again wrote the Secretary as follows The anticomic was son on February 24th, 1919;

"On the 20th inst., I wrote you a letter in which I asked for:

- The william from these time about Alarman To-1. The estimated expenditures for the current fiscal year.
- med at this loss to the honorage as worthally a 2. A statement showing how much money has been expended on the Chippana Development up to the present.

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Each are respondituon and abili bodebianos : from each grane of the late the two are directly took bed doid aron to income of the o and the second were first married and the self-married by James Son Print and State mailine of the Cominsion were relying largely on the confine the same of the part of the fact that the same of the state of with a property and those development had shall have his browned DESCRIPTION AND ADDRESS OF THE PARTY OF THE Constitute, verta officially open the conflicted by technique oversible an exclusional set to The second secon Leight field field. Fan address to graph of the later the set todays, value will be sailteen and in the lowers. sould a little fit abscesses at an east allowand white all \$4 km. a shoulded abunded formulation "Lyngle also mee the prison principle a sell tale along I." AND ASSESSED AND ASSESSED AND ASSESSED AND AND ASSESSED. and I make allowed a male algorithm and the from Supportion and Son to harplevel or live removement between milweds which they or places this I was not not endange sides the out" her , tached out anivertiah made and toote to reduce. "would be allowed in smill tent in the set of the little I THE RESERVE OF THE PARTY OF THE WELL adding purposes are canno Locall Commun add not normalizable baland to become over not give her set you are frequent of

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- 5. A statement showing what horsepower will be developed at that cost.
- "In the information given me to-day, I see nothing except the estimated amount to be expended this year.
- "I would like you to give me the completed information with as little delay as possible."

This letter was answered the next day by Mr. Pope as follows:

SALES THE STREET, P.

Division and Property of the Park

"Toronto, February 35, 1919.

"Honographo T. W. Kedarry.

"Door Sir:

ro: CHIPPAWA

"Yours of the 24th instant to hand. I regret that the information furnished you by Mr. Gilmour. our Treasurer, did not contain all that you require.

"I am now instructed to advise you, in reply to your letter of the above date, that the amount of money expended on the Chippews Development up to 51st January, 1919, was \$8.487,215.52. of which approximately \$5,000,000 was for construction plant, and machinery.

"The cost of the completion of the work was estimated at \$24,000,000 to \$25,000,000. The horsepower to be developed at that cost is estimated at 300,000 h.p.

"Trusting this will give you the information you require.
If, however, there is anything further I shall be pleased to furnish it.

15.

Yours very truly,

(Bigmed) W. W. Pope.

Secretary"

It will be seen from the above letter that the estimate submitted at this time to the Government was practically the same as that submitted to the Premier twelve months before, and no mention is made of any changed conditions necessitating an increase in the cost.

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While Mr. Acres states that the date on which they were irrevocably committed to the larger development was on March 16th, 1918, there appears to be no doubt that at the time the Commission wrote the Prime Minister in February, 1918, the engineers of the Commission were aware that the onlarged scheme would be proceeded with.

Er. Caby, in explaining the similarity between the estimates of 1918 and 1919, stated:

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of for present type of emermes in this applicable, and

"To change had been made in those estimates, or no new estimates had been officially made from 1917."

Mr. Gaby was asked:

"Was this as fair a statement as you could make to the Government at that time (1919), of the estimated cost of the completion of the work?"

EV.

He replied:

"Having due regard to the conditions that were in existence at that time. I would say yes. In view of the labour conditions, and it was just succeeding the armistice, it was our anticipation that there would be a very great reduction in labour, and less stringency than obtained in the war days. In other words, we anticipated that material would be much more free, and there would be a reduction in the cost, and we estimated there would be a falling market. On the contrary, the costs exceeded our anticipation, and we would have been warranted in changing the estimate."

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Experimental work on the models for the intake was continued and completed on November 5th, 1919. The results of the experiments were made the subject of a report, and recommendations made which Mr. Gaby stated were submitted to, and approved of, by the Commission. Mr. Gaby was not able, however, to point to any Minute showing official approval

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of the proposals submitted. The recommendations were adopted, however, the estimated increase in expenditure being \$1,922,720 over Estimate No. 2-4.

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Mr. Acres was asked at the hearing:

"Then that would show a total estimated gost on the basis of the present type of construction and capacity, of \$27,025,535?" (Late in 1919) [Late Cold Dist. No. 12 9740 Af Cold

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No replied:

"Presumably, yes." Ma't till, there were per making a profession.

We have been unable to learn anything which would indicate that the Government was advised of this proposed increase in expanditure or the decision of the (Companion) to Alter the plans which were originally made for this part of the work.

Aggording to Mr. Acres the estimated cost of the Development late in 1919, was only slightly over \$27,000,000, but it must be pointed out that on page 8 of the report of Messre. Clarkson, Gordon & Dilworth upon the accounts of the Cormission for the year ending October Sist. 1919. the following statement appears:

"It is estimated by the Curmission that the ultimate cost of the works will be about \$40,000,000.00, and that they will be completed to an extent permitting generation of power by the Pall of 1921."

Mr. Clarkson, when asked from whom he got the above information. said:

"That was obtained from Mr. Gaby I should say in Rebruary Mr. or Earch, 1929."

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Mr. Gaby was asked:

"How did you arrive at the figure that you gave to Mr. Clarkson of \$40,000,000.00?"

EV.

He replied:

"Mr. Clarkson, while walking down the hall with me in the Commission's office, asked me if I thought we could build our canal for \$24,000,000 to \$25,000,000, to be completed some time in the Spring of 1919, and I told him, no, in view of conditions that existed at that time, and the changes in the past year, that had not met our expectations, we could not do it for that amount of money. He wanted to know how much, and I told him, I couldn't tell, there were no estimates available. He said 'Can't you tell me approximately?' and I said, 'Prebably sixty to seventy per cant. increase in wages, and sixty to seventy per cant. increase in wages, and sixty to seventy per cant. increase in wages, and sixty to seventy per cant. I told him until we went into the details, I could not give him anything in detail."

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Mr. Gaby Covidence as given above was read to Mr. Clarkson,

who stated: /

"Now, the facts of the situation are these, that every year at some time, maybe two or three weeks or maybe longer, it might be a month, before our report was issued I had word sent to Mr. Suby through Mr. Suilfoyle, or rather I spoke to him directly, and told him that I would require to know, for the purpose of the report, what the estimated ultimate costs of the canal wers. Mr. Suby had his information and he was able to give me that statement at once, or, if he hadn't the information and this did occur, a delay took place before he gave me the figures. In other words, we approached the matter in a perfectly formal manner. There was no such thing as just passing in the hall and asking what it would cost. It was approached formally, and the amount was given to us formally for the purpose of the report."

EV.

Whatever Er. Gaby's remembrance of the matter may have been at the time he gave evidence before us, there is little doubt that Er. Clarkson felt sure that the figure given to him represented the Commission's estimate as to what the cost would be under the them existing conditions, or he would not have embodied in his report a statement as to the estimated cost in such definite terms. Nor could the Commission's Chief Engineer

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opinion on the matter arising out of his knowledge of conditions then existing on the work. From this it can only be concluded that the Commission realised during 1919 that their antimipation, as to decreased costs after the Armistice had been signed, would not be realised and that their estimates of cost would be greatly exceeded. Mr. Saby, in his evidence admits knowing that wages had increased probably to the extent of sixty to seventy per cent. The situation appears to have been that, while the Commission was fully sware of the continually increasing costs, the first official intimation the Government received was the statement contained in the Auditor's report for the period ending October 31st, 1919, presented in the Spring of 1920 showing that the estimate of cost had been increased to \$40,000,000, almost 50% above the estimates then in its hands.

taining may be assumed from the fact that in April, 1930, he recommended the engagement of Hugh L. Cooper & Company, New York City, to prepare a complete report on construction work at Misgara. The following is a Minute of the Commission in this connection, dated April 27th, 1920:

"The Chief Engineer submitted a recommendation setting out a proposition from Hugh L. Cooper & Company, of New York City. covering the preparation of a complete report on the construction work at Miagara, at an estimated cost not to exceed \$10,000 to \$12,000. After careful consideration it was decided that the same be approved and the services of this Company engaged."

Company was discredited by the Chairman of the Commission, although

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the Chief Engineer's memorandum to the Commission of April 27th, 1920,

described Er. Cooper as "practically the only man available the is qualified

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through direct personal experience to prepare the report".

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We have the hour's statement, printed by least 200, none than expenses a

Summing up the situation obtaining late in 1919 in respect to the figures then being officially used by the Commission as representing the cost of the work, we have the following:

Estimate No. 2 - November 27th, 1917	\$24.316,615
Ro. 2-A, January 3rd, 1919	786,100
Additions in respect of improved intake, late in 1919	1,922,720
Total of engineers' estimate late in 1919	\$27,025,635

It is important to hote at this point that the figure of \$27,000,000 represented the estimated cost of the 300,000 horse-power plant as finally constructed, no radical or extensive changes in the design being made after the improved type of intake was added. We find that the plant as constructed for 500,000 horse-power, instead of costing \$27,000,000 as was expected late in 1919, actually cost over \$64,000,000, or in other words the actual cost exceeded the estimated cost by \$37,000,000. This will be discussed in a later part of this report dealing with "Reasons for Increases in Satimates".

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It is important to consider whether or not the Commission was justified, under the conditions known to exist at that time, in assuming and leading the Government to believe that the cost would be on the order of \$27,000,000.

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We have Mr. Gaby's statement, quoted on page 180, that they expected a material reduction in labour and material costs after the Armistice in November 1918. It is not unmatural that Mr. Gaby and the Commission should have expected a drop in prices at that time, but it is common knowledge that instead of conditions becoming more stabilized, costs increased and during the Spring of 1919 it was evident that predictions of the previous Fall could not be realized. Thus, there was ample time for the Commission, between the Fall of 1918 and late in 1919, to realize that their expectations would not be fulfilled.

first, the study of progress of the work at that date, and second, the expenditures that had been made. From the Auditor's report for the period ending October 31st, 1919, we find that up to the end of that fiscal year an amount of \$14,713,970 had been expended on the work. In other words, an amount equalling over one-half the total estimated cost had been expent at that time.

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Examining the progress that had been made on the largest element in the cost of the work, namely, the excavation in the canal, we find that at Cotober 31st, 1919, only 35% of the earth excavation had been removed and only about 8% of the rock had been excavated. In addition the intake work had not been commenced and very little had been done on the power house construction. Even deducting the sum of over \$3,300,000 which had been spent on plant, the disproportionate relationship existing between money expended and work done is such that it can lead one only to the conclusion that the Commission must have known that the estimates would be greatly exceeded.

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rurther, there was another matter which must have definitely indicated at that time that the estimates would be substantially exceeded. We refer to the output that was being obtained from the excavating units. We deal with this matter in detail in another section of this rejert, merely pointing out now the fact that until the end of 1919 the average output of the excavating units was approximately one-third of the casacity estimated upon by the engineers of the Commission in Estimate No. 2. This meant that with the units doing only one-third of the work expected of them, they would either take three times as long as expected to do the work, or that the number of units would have to be approximately tradled to complete the work in the required time.

Considered from the standpoint of cost, it does not necessarily follow that the cost would have been three times as great, but generally speaking in point of labour charges alone, the number of men required to serve the excavating units at their actual operating dapacity was the same as if the units had been giving results equal to those estimated on. The engineers of the Commission knew these facts from the very commencement of operations, for the showels, except at isolated times, never maintained during a protracted period an output even approaching the anticipation of the engineers.

Civing every consideration to the expectations of the Commission regarding the full in prices after the Armistice and making every
other allowance possible for the conditions then obtaining, the actual
performance of the excavating equipment was proof positive that their es-

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timates would never be realized, yet the Commission chose to disregard

The situation from early in 1920, so far as the Government was concerned, may be understood from the evidence given by the Honourable 5. C. Drury before this Commission on April 3rd, 1923:

- Q .- When did the question of this Chippawa Development first come before you for consideration?
- A.- Well, in an intensive way it came before me sometime during the first weeks of 1920, when the question arose of a special report that we wished to have made by Er. Clarkson, which would set the whole matter before us.
- Q.- In the Minutes of the Commission of March 23rd, 1930, I find a reference to the receipt of a letter from you dated March 18th, in reference to the estimated cost of the Chippawa Power Canal, etc., and the note concludes in this way: "..... was carefully considered and ordered to be filed, the Chairman having interviewed the Prime Minister in this respect." Do you recall the interview with the Chairman of the Commission at any time in about this period in 1920, at which the cost of the completion of the Chippawa Development work was discussed?
- A .- Well. would that be the interview in which the Chairman mentioned to me the desirability of employing Er. Cooper?

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4.- What was the first estimate you received from the Commission or any officer, in reference to the sest of completing the Chippawa Development?

- A .- The first estimate that I received was the estimate contained. I think, in Mr. Clarkson's report, of \$40,000,000. That was as it came to us, \$40,000,000.
- Q -- Then, when did you first learn that that estimate was likely to be exceeded?
- A.- My recollection is that sometime not long after that report was made, the Chairman came to me and said that he himself was verried about the increasing costs, and suggested Mr. Cooper's name as an engineer that it would be desirable to get to report upon the estimates, and asked me to write to the War Office at Washington in regard to Mr. Cooper's qualifications. I did.

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- Q-- And got a satisfactory answer?
- A.- A very satisfactory answer, yes.
- Q.- Did you communicate that, then to the Chairman of the Commission?

DESCRIPTION OF THE RESIDENCE OF THE PARTY NAMED IN ADDRESS.

- A.- Yes. I of time, or a think the control pages taken the
- Q .- And Mr. Cooper was retained?
- A.- Yos. in many
- Q.- Then shat was the next you learned about the possibility of the cost exceeding the estimate of \$40,000,000?
- A.- The next would be when the Gooper report was received. Maturally, the question rested while the Gooper report was being made, but I think that the next time the matter was brought before me, was when the Cooper report was received.

Q.- Then what happingd PY

- A.- Well, the matter was discussed them at a meeting between the Chairman and myself. The Chairman came to see me at my office and told me practically that I need not worry about the Cooper report, that he had very good reasons for discrediting the Cooper report, and that I need not take it at all seriously.
- Q .- What followed that?
- A .- The next outstanding thing was the conference arranged at Biagara, in the Autum of 1920.

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% -- Who were present at that conference?

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- A.- Sir Adam Book, Mr. Milmer. Col. Carmichael and myself, with Mr. Gaby. Mr. Acres. I think Mr. Angel. Mr. Stuart was there part of the time; and Mr. Morbangh, and I think Mr. Lez and Mr. Johnson.
- Q .- Then what was the subject matter of this conference at Hisgara on this occasion?
- A.- Well, the whole question, as I remember it, brought before the conference was as to the credibility of the Cooper report. We went down on the morning of one day and spent the day going over the works; in the evening we had a conference in the Clifton House, and the next morning we had a conference in the Clifton House, returning the next afternoon and getting to Toronto in the evening.
 - At the conference the work schedules were gone over, to show that

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the Cooper report was in error in point of time of completion, and the cost schedules up to that time were gone over in some considerable detail. Of course it was a matter which was not in my province and I did not know anything about it, not being an engineer; but the thing that was brought out was that in all points of time schedules, perhaps I ought to say, they were ahead of time, and that the costs were below the Cooper estimate.

- Q .- That the work schedule was ahead?
- A .- Of the schedule as to time. They had a schedule arranged as to what should be accomplished at various dates in order to complete the canal by the early Fall of 1921, and that was some into in detail, in the rock section and in the dredging section and in the sorth section; and we were shown that the schedule, was, I think, up to or shead of time in all these things.
- Q.- That is that the work was all ahead of the Coumission's own schedule, as you recollected?"
- A. Yes, quite.
 - Q .- Then you say that the jost was gone into, and what was the report or intimation or decision as to costa?
 - A .- There again I have got to depend on my memory. I do not remember the costs being greatly emphasized. We were assured that there was nothing to back up Cooper's contentions, and we were promised, I think, that reports would be prepared which would deal fully and exhaustively with the costs.
 - 2 .- Did you have the Stuart & Earbaugh report or estimates before you at that conference?
 - A .- No. I do not remember it at all. I suppose we spent about five hours on it in the conference in the evening and three hours the next morning, about an eight hour conference.
 - Q.- Did the conference cover a griticism of Mr. Cooper's construction and plant?
 - A .- Yes, particularly in regard to the intake. I remember that matter was gone over in considerable detail.
 - C .- And what was the conclusion reached in reference to these?
 - A .- Tell. we were assured that the plan of inteke as proposed was a feasible plan, that it had been tried out in models. I remember we were taken over to see the work; the coffer dams were in and the mason work was being constructed, and we were shown how the fingers would lie in the river to take care of the ice and gravel coming down.

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- A -- Of the solding as to time. They had a consected erranged as to wist absolute what absolute the complete what absolute the contact that the contact the contact that the the treatment and the contact that the the treatment and the contact that the contact and contact
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HYDRO-ELECTRIC INQUIRY COMMISSION

- 0.- Fore the other points of criticism also taken up and dealt with at this conference?
 - A.- The time part, yes, and the matter of costs in a general way. short, I williad his all emery to him
 - Q .- I meant the other criticisms by Mr. Cooper of the design and so on?
 - A.- Yes, those were all dealt with at that interview. the best of the best of the party of the state of the state of
 - Q.- Then you say a promise was made? to you the Private the sealing horospanic while
 - A .- That there would be further reports, yes. terretaining of the years A telling one were alligate fa-

In September, 1920, Messrs, Stuart and Kerbaugh of New York City were asked to make their report in connection with the Davelopment. Sir Edam Beck appeared before us at the hearing and his evidence in connection with the appointment of these experts is as follows:

- Q .- Then are you alle to ap whether you brought before the Commission at this time the question of securing additional ouperts? The Einute does not show it.
- A.- I brought that before the Prime Minister, I saw the Prime Minister about it I think before there was a Commission me oting. I at once saw him and explained to him fully my loss of confidence in Mr. Cooper's conclusions; I do not know whether at that time, but at some time not far distant from that day I saw him and I suggested getting other experts to investigate the Cooper conclusions. and the second second
 - Q .- Now did you come to select Mr. Stuart?
 - A .- I do not know. Hr. Rowell: but I think it was largely due to Mr. Angel and Mr. Acres Mr. Merbaugh I think was a contractor, and Mr. Stuart, of course was one of the large outstanding engineers in the United States, very highly recommended. THE RESIDENCE AND ABOUT A SPECIAL ROOM.

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the absgrade hilling read. We be in himse

While Bir Adam Book states that he had in mind the appointment of Messra. Stuart and Merbaugh to investigate the Cooper conclusions, it does not appear that they were engaged specifically for this purpose, nor was any mention made of this matter in instructions forwarded to them under date of September 14th, 1920. The instructions sent to Messrs. Stuart and

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name with the project or of

Kerbaugh as signed by the Chairman of the Commission read as follows:

"Pursuant to agreement reached during our conference in Now York City on the 7th instant, I would be pleased to have you prepare a report, in collaboration with Mr. H. S. Kerbaugh, on the Queenston-Chippawa Development achema, such report to cover in particular the suitability of the plant for the construction program which we have in view, the date upon which you consider it will be possible to complete the work to the extent necessary to put the first two 55,000 horsepower units in commercial operation, and the estimated cost to complete the installation of the first 5 units, and the ultimate installation of 9 units."

Ex.

Section 31

REPORT BY HUGH L. COOPER & COMPANY

Hugh L. Cooper & Company commenced their examination on april 26th, 1920, and practically completed their investigation on august 17th, 1920. In a general way their conclusions covered the whole Chippawa project. In some cases the opinions and recommendations expressed are definite, while in other cases the references indicate that no special study was given to the detail in hand.

The report, as submitted, consists of a letter of transmittal, dated August 7th, 1920, which was submitted on August 14th, and this letter was followed by a report dated October 22nd, 1920.

The field report to attempt tiple in each up recipies all \$1 like.

Our Consulting Engineer, in outlining the qualifications and experience of Mr. Hugh L. Cooper, states as follows:

"No has designed and been connected with works totalling over a million horse power, and costing over a hundred million dellars, in the United States, Canada, Brazil and other countries."

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It would appear from the information given by our Consulting Engineer that Mr. Goby was justified in considering Mr. Cooper well fitted as an engineer of wide experience to make a report on the passaston-Chippens project. We have already quoted the Chief Engineer's views as to his qualifications.

while the report of Mr. Hugh L. Gooper deals adversely with certain details of the design, it would appear that he is in general agreement with the project as adopted by the Commission's engineers when he says in his Preliminary Report, dated August 7th, 1920:

the best that could have been adopted when the history of your project is fully understood We believe the expenditures which you fill be required to make on this project will be justified by the beneficial results which will accrue to the industrial life of the Province of Ontario."

This opinion he apparently still held when his final report dated October 22nd, 1920, was made, for, in it, he states:

"In this report no attempt will be made to restate any of the views or opinions submitted in our report dated August 7th and the August 7th report together with the matter herewith submitted constitutes our final discharge of all the work we understand we are to perform for you under the existing contract."

It is interesting to note in passing that the Chairman of the Commission, in one case, magnified the criticism of Mr. Cooper. In his evidence before us, the Chairman said:

"Of course, the Power House foundations were very alarming, when he (Er. Cooper) said that probably the whole building would fall into the river before we got it up."

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What Mr. Cooper said in his report was:

"The foundation rock available is a red shale of acceptable quality for bearing purposes. These foundations, however, will be exposed to additional indeterminate and excessive lateral pressures from ice jams that occur in the river at and near the power house site. We recommend that further borings be made in the river adjacent to the power house site, for the purpose of conclusively ascertaining the extent of the rock slopes. If further explorations show that the present power house location is in any danger from overhanging or insufficient slopes, the present location should be moved back from the river to such a position as good judgment dictates."

This was quite a conservative way of describing a doubt which apparently had arisen in his mind.

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three different headings which he refers to as Cases I, II and III. A
summary of these estimates has been made by our Consulting Engineer on page
C-37 of Chapter C of his report, and is included herewith as page 194. Mr.

Prancis, in explaining the basis on which these estimates were made, pointed out that:

Case I is given as the estimate of cost of the project as designed by the Hydro-Electric Power Commission engineers, wherein Hugh L. Cooper & Company's quantities and unit prices have been applied using 18,000 cubic feet per second of water.

Case II is an estimate of cost of the project wherein Hugh L. Cooper & Company have introduced modifications in design, in accordance with their letter of transmittal, dated August 7th, 1920, applied their quantities and unit prices, and used a flow of 15,000 cubic feet per second.

Case III is the same as Case II, but using 20,000 cubic feet per

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Welland River	1,831,434	1,831,434	644,995		1,289,071	1,920,170
Power Canal	22,912,732	22,912,732	22,264,311		25,585,602	26,022,763
Forebay	365,502	385,502	610,502		2,449,795	2,449,795
Sorean Rouse	1,582,823	1,777,398	1,549,071		2,193,122	2,495,122
Penstocks	1,175,985	1,672,675	1,178,985		1,364,766	2,533,850
Power House	5,116,005	8.020,424	5,116,005		6,125,120	10,562,967
Hydraulic Equip.		5,557,000 8,417,360	4,752,160		5,668,460	11,166,260
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Bridges	1.534.023	1.634.023	1,534,023		1,534,023	1,534,023
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Total	44,657,600	53,667,543	40,236,535	49,994,710	49,348,055	64,061,806
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at 8%	3,572,608	4,295,403	5,218,922	3,999,576	3,947,644	5,124,944
Total	48,230,208	57,960,946	43,455,457	53,994,267	53,295,899	69,186,751
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Charges	4,193,209	4,676,984	3,407,434	4,222,347	4,692,726	5,743,755
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Total	52,423,418	62,636,931	40 4 00 6 4 0 A W	58,216,635	57,988,626	74,700,000
Total		100				
Disbursoments	14,000,000	14,000,000	14,000,000	14,000,000	14.000.000	14,000,000
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GRAED TOTAL	66,423,418	76,636,931	60.862.692	72,216,735	71.988.626	88,930,506
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Interest Charges are compounded semi-annually at 6-1/2 per cent.

Fotal Disbursements are to May 1st, 1920, plus interest compounded annually to January 31st, 1923.

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second. All estimates are of the cost to complete by January 1st, 1923.

From the estimate submitted on the project as designed by the Commission's engineers, namely Case I, it will be observed that Er. Cooper estimated that the complete installation of five units would cost \$66,423,418 ujf.

and the installation of nine units \$76,636,951.

At the time the report of Mr. Cooper was made, the most recent estimate that had been made by the engineers of the Commission was that submitted to the Auditor, Mr. Clarkson, in the Spring of 1920 in the amount of \$40,000,000.00. Bringing these estimates to a common basis of comparison, and provided that the Cooper figures were correct, the engineers of the Commission had at that time under-estimated the cost of the work by over 10%.

The engineer of the Commission submitted an estimate to our Comsulting Engineer under date of Pebruary Elst, 1923, wherein they use a figure of
\$64.370,180 as a final estimate of the cost of five units, installed. It is
interesting to note the close resemblance between the total figure submitted by
Nr. Mugh L. Cooper in the Pall of 1920 and the last estimate made by the engineers of the Commission, over two years later, although the details are at
variance. In a similar way the angineers of the Commission submitted to our
Consulting Engineer on Pebruary Elst, 1923, a figure of \$75,831,067 as the final
cost of installing eight or nine units. This figure bears aven a closer
resemblance in total to the estimate by Nr. Cooper submitted in the Fall NJP.
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of 1920 for the final cost of installing nine units, although again the Part II
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The resemblance in final costs between the estimate of Er.

Cooper and that of the Commission's engineers, was drawn to the attention of

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- most basid furnished on this process his district office on August Mr. Gaby at the public hearing, who appeared to regard it as a sections the exposure given by Dry those make an follower coincidence. Extracts from his evidence are as follows:
 - Q .- Then let us see if I rightly understand your testimony. He was basing his estimates on slower progress?

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- A.- Vary much slower progress.
- Q .- Than that which you had estimated?
- A.- Yos.
- Q .- And basing it on slower progress he get higher unit costs?
- A .- Yes, he would, on account of the higher overheads which would be chargeable to the unit costs.
- Q.- Then when you did get his estimate of the total cost of the five units installed, what did it amount tet
- A .- Including the costs that I'm not included in the estimates of the Commission, it underted to some sixty-six millions of dollars for the first five units on the basis which he stated that we would carry the work on, and some sixty millions on the basis on which he would carry it on, having gartain variations connected with it. and ask
 - Q .- On the basis of your plans, his estimate was some sixty-six millions from how not this protect, it is to be noted that Hos Congres
- A .- Including items which we had not included in our estimates.
- : Q.- Including what?
- A .- For instance, he included a skimmer and an iceway amounting to some four or five hundred thousand dollars, which we had not included at all, and did not think necessary.

VIVES ARREST SUATON CORRESPONDED AND AN

- ... What struck me was that it was surprisingly near the actual costs as it subsequently developed for the five units. He gives you an estimate of \$66,423,418? AME TAKEN AND PROPERTY OF THE RESIDENCE OF THE PARTY OF T
 - A .- Well, that may have been a coincidence. the water than had been completed at what have not in
- Q .- And you reject this estimate because you claim it is too high? ANTHORNOUS ABSCRIPT ANTONIO AND DESCRIPTION OF THE PARTICULAR PROPERTY OF PARTICULAR PROPERTY AND ADDRESS OF THE PARTICULAR PROPERTY AN
- A.- I did not say that. I stated that I rejected it because I did not agree with the treatment, and with the manner in which those unit costs were arrived at.

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questioned further on the reasons for disregarding the Cooper estimate the evidence given by Mr. Gaby reads as follows:

".... For instance, he (Mr. Cooper) asked one of our cost clerks to go to New York and instructed him while there, against his better judgment, to prepare unit costs on the minimum basis of excavation, which is away less then the actual schedules obtained in the operations. Now, he asked him to do that against the wishes of this Cost Clerk of the Commission, and he used those cost unit prices for the basis of preparing his report. The Cost Clerk reported to us on returning from New York what he had been required to do by Mr. Cooper, and having that information before us and the general data, and knowing that certain parts of the engineering details of this report were not in conformity with those of the Commission's engineers and myself, the Commission thought it desirable to have a check on Mr. Cooper's report *******

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Mr. Gaby then discussed in approximate detail the yardages estimated upon by Mr. Cooper and Mates:

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Labbys to the business with him stransformer.

"I have just forgotten the exact number of yards, but they were away less than the actual schedules we had prepared for carrying on the work and our schedules that had been prepared and discussed with the engineers of the Commission."

EV.

In review of this matter, it is to be noted that Nr. Cooper was appointed in the month of April. 1920, and submitted his final report in the month of October, 1920, and during this period made parsonal examinations of the work.

It would appear that Mr. Cooper came to the conclusion that there was little or no hope of the excavating equipment ever realizing the capacity which had been estimated for it by the Commission's engineers, and having regard to the extent of the work that had been completed at that date, and in anticipation of unforeseem difficulties in the future, assumed conservative

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pay of the subt really really right by Mr. Smyth in

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figures in working out his estimate. Mr. Cooper's judgment in this matter appears to have been entirely justified by actual events. In the second case, he used in the words of Mr. Gaby "very much slower progress". It is to be remembered that when Mr. Cooper made his report rush schedule operations had not been put into effect. It would appear, therefore, that Mr. Cooper was quite justified in anticipating that the work would be completed with the equipment then in use and with a working force of the same proportions as then employed by the Commission.

In making his recommendation to the Commission on April 27th, he describes Mr. Cooper as "practically be may men available who is qualified through direct personal experience to prepare the report". Mr. Gaby in giving reason for disregarding the Cooper report states that Mr. Cooper "instructed him (cost clerk) ... against his better judgment". Secondly, "They (schedules) were away less than the actual schedules that we had prepared for carrying on the work....."

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one can only conclude that because Mr. Cooper's assumptions

were different from those of the Commission, the Commission chose to disregard

his estimate, and that Mr. Gaby placed more reliance upon the judgment of his

"cost clerk" than on the judgment of the engineer whom he considered in

April, 1920, the only man qualified to prepare the report. The wonder is

that the "cost clerk" was not employed to prepare the report instead of

Mr. Cooper.

The estimate submitted by Mr. Cooper includes information relative to the basis on which his computations were made. No close compari-

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the final costs compiled by our Consulting Engineer, as the subdivisions used by Er. Cooper are different from those used by our Consulting Engineer in making his analysis. It is not unnatural that this should be so, as the manner of making up detailed estimates varies widely even in good practice. It is impossible to find any two contractors whose estimates on the same work agree in detail, though the final total of both may be approximately the same.

of the Commission to advise the Premier to set saids Er. Cooper's estimates, the practical effect of such advice was that the Government disregarded Er. Cooper's report which would have given it a proper conception of the ultimate cost, and it was not until february foth, 1922, that the Government came to a full knowledge of the total cost of the work.

Section 32

REPORT BY UTUARY AND KNEBAUGH

of an expension to be developed in all their facilities. In

estimates, a recommendation was made that Messrs. Stuart and Kerbaugh be engaged to report upon the work. From the records and evidence it would appear that they spent about a month in going over the work and were in consultation with the engineers of the Power Commission and obtained from them all available data in respect of unit costs that had been compiled at that date, output records of shovels and other information. Their investigations were carried on largely during the month of September.

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sion, signed by Francis Lee Stuart and H. S. Kerbaugh is dated September 30th, 1920.

At the time investigations were being made by Messrs. Stuart and Kerbangh, about 55% of the earth excavation had been completed while the rock excavation was only about 25% completed. By referring to the diagrams on page H-156 of our Consulting Engineer's report entitled "Chapter H - Construction Plant, Earth and Rock Excavation, Canal", it will be seen that the heaviest rock out had not been commanced at that time. The despost section of the canal occurs at mile 3 near lundys Lane, where the total depth of excavation is approximately 140 feet, made up of about 80 feet of rock and 60 feet of earth. Undoubtedly the most expensive part of the rock exception was in the deepest section, where, over a length of three miles, the sworage depth was about 60 feet with an earth overburden of 40 to 60 feet, so the unit costs available for work dome proviously and under better conditions, could hardly be taken as a fair indication of the cost of excevation to be carried on at such depths. It soems clear, however, that Messrs. Stuart and Kerbaugh relied almost entirely on the records of the Commission in the compilation of their estimate for, had they not, they would not have been able to submit a report within a period of a month on a work of such magnitude.

The original report contained eleven pages of typewriting, and was made in accordance with the request of Sir Adam Book that the mathers should express their opinion and conclusion on the following features of the undertaking, namely:

1. Suitability of the plant for construction program proposed.

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is the time investigations were being unit by Meanra Store within her before many that and there are the first factor and the not no successful and administration of the same special and adding the same heliline draws at readland pointered and he delen egag at the THE PROPERTY OF THE PROPERTY AND ASSESSED TO SELECT THE PROPERTY OF THE PROPER gall of married may be not be seen to make the soul fall may of fifty which when you will be a winter it the the court of the first through the state of to pe tile part the plant property in companies to depth face of the com-And the state of t on your process, substant case and the first state of the first APPEAR OF THE WASHINGTON TO A PARTY OF THE PARTY OF THE PARTY OF THE PARTY. your over not administrate expensions out on proof 65 of 65 in columniate what is no make he will be a partial block and a band of the plant transport of the plant t petices out to an adeque of of militarium to free oil he explosited ment above, numeric but hearty outsit has named and another made Talken to extinit place out of enthalmed with the placement of an appetit.

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- Possible dates of completion of the canal for generation of power by the first and accond units at the Power House.
- 3. Probable cost to complete.

In answering question 1, the various details of plant are dealt with and in summing up, the authors state that sound judgment has been used in the selection of equipment for the construction involved, and particularly in having provided 325-ten shovels with eight-yard dippers for work in the canal, and modern standard gauge equipment for transportation needs. 6-43

In dealing with the time of completion referred to in Question 2, the authors look upon the canal as the controlling feature in the completion of the entire Development for production of power on any given date, and they work out a school of approximate output of shovels required per month in earth and rock, to complete the canal for generating WJP. power by November 1st, 1921. CHARLEST AND ADDRESS OF THE PARTY OF THE PAR

In reporting upon the cost of the work, the authors made an estimate of cost to complete the power canal and installation of five units and the first stage of the intake construction, which appears on the TWING THE DIVIDING **売やちゃる 第** following page.

Our Consulting Engineer in Chapter "C" of his report describes in detail the qualifications of Francis Lee Stuart, Consulting Engineer, and H. S. Kerbaugh, Contractor, the authors of the report which has just been discussed. Prom the statements of our Consulting Engineer, it would appear that Mr. Stuart is one of the heads of his profession, and that Mr. Kerbaugh is known throughout the continent as having carried out some of the largest construction contracts in the United States.

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3. Probable cost to complete.

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Section Cos	t to Aug. 26, 1920	Remaining Cost	Grant Total
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2. Welland River	387,568	\$1,340,003	0 1,699,581
3 & SA. Canal	7,071,023	974,623	1,362,391
4. Porebay	794.154	16,294,033 116,000	23,365,086
5. Sereen House	97,794	976,300	910,154
· Penstocks	38,626	1,052,310	1,074.094
- Power House	437,701	1,580,000	1,091,138
. Hydraulic Machinery	454564	1.646.000	1,997,701
. Right-of-Way	1,000,000		1,548,000
Miscellaneous		200,000	1,000,000
Bridges	909,000	1,091,000	200,000
ADIL CO. AND VALLE SEED AND ADDRESS.	and the second section of the section o		2,000,000
	\$10,995,646	(25,250,469	\$36,246,115
	Continge	ncies 10%	3,624,511
Satimate of Gost of S	OPY	t Cost	\$39,870,726
	equipment up to L.T.	· Nes · · · · · · · · · · · · · · · · · · ·	5,301,033
	110h	**********	4,700,000
the state of health and	Total In	restment	\$49,671,759
ess: Possible Salvage Receipts from Bro		. \$4,000,000 . 2,600,000	5,600,000
Altrigate of		AND NOT STOLEN BOUNDED BY A STOLEN BY AND A STOLEN BY	
	Total Wat	Investment	\$43,271,769
The second of the		st per H.P	173.0
"THE STREET, SHE AND		st par H.P	173.0
se of 15,000 c.f.s., s ine (9) units producin	of present plans cont and the installation of 450,000 h.p. and v	complates the full of a total of	173.0
he pitimate capacity of se of 15,000 c.f.s., a ine (9) units producing matalled. \$9,000,000 a stimated cost of	of present plans cont and the installation ag 450,000 h.p. and w dditional capital. a	completes the full of a total of vill require when making a total	173.0 \$52.271.759

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They also submit the following unit costs on which their estimate is based:

Earth Excavation		
Book Excavation	2.70 p	er oubic yard
Plain Concrete	14.50 pe	er ouble yard
Reinforced Concrete	25.00 p	r onbie yard

It will be noted that Messra. Stuart and Kerbaugh figured that the cost of the work complete, with a total of five units installed would be \$43,271,759 and with nine units installed \$52,271,759. When compared with the estimate made by Mr. Cooper submitted some few weeks before, the estimate made by Messra. Stuart and Merbaugh is ever \$23,000,000 less for the five-unit plant, and over \$24,000,000 less for the nine-unit plant.

in concluding their report the authors state as follows:

"In general we have to advise you; first, that while this is a large undertaking it is in excellent shape for early completion; second, that all unknown conditions and uncertainties of construction have been eliminated; third, that the equipment is suitable; fourth, that we think the peak of inefficiency of labor and the peak of prices of material and labor have been reached; and fifth, that with no unusual labor conditions, and with materials properly supplied we consider the estimates of cost and dates of completion as feasible and dependable.

"The project and its purposes appeal to us in all its phases.

The conception and design is simple and effective and the construction work is being carried out with proper present day equipment and in an intelligent, capable way, with credit to all concerned."

WJF. 0-47

In referring to the appointment of Mesers. Stuart and Merbangh, Mr. Gaby stated:

"No thought it (the Cooper estimate) was very excessive, and immediately arranged for an eminent engineer, Mr. Stuart and a contractor named Kerbangh to go over this work and re-check the estimatet."

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Evidence given by Er. Acres in connection with the Stuart and Kerbaugh estimates was:

- Q .- So the two estimates Stuart and Merbangh gave on the work. on which you were actually to proceed, are the ones for the 250,000 immediate installation, and the 450,000?
- part Too, sire of a Penemerale De Ca Jordan
 - Q .- And are \$43,000,000 and \$52,000,000 respectively?
 - A.- Yes, sir.
 - Go- Now, you concurred in that estimate at that time as fairly representing what, in your opinion, would be the total cost of the work completed, up to these capacities?

are Your Mad with the data to willist you account to the property of

As- Tes, sira

EV . 4158

Mr. Caby pointed out that the report submitted by Mesers. Stuart and Kerbangh showed adduction of \$6,600,000 covering "possible salvage recoverable and receipts from broken stone", and that the actual estimate was therefore \$49,871,759.

EW . 4375

On the basis of Mr. Gaby's interpretation of the Stuart and Kerbaugh estimate, it will be seen, therefore, that the installation of a five-unit plant was approximately \$50,000,000 or \$10,000,000 in excess of the estimates submitted by Mr. Gaby to Mr. Clarkson about seven months before, and over \$16,000,000 less than the Cooper estimate for a plant of this capacity.

Section 33

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SPECIAL SPECIAL

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The report of Mesers. Stuart and Kerbaugh was dated September 30th, 1920, but it was not officially presented to the Government until

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ি গ্র ক্ষেত্রটোক্তা একাজিককার 🐪 🗸 এক এই একট There were not as as following printing on one of the joint pirot January 21st. 1921, when Mr. Saby wrote the Prime Minister enclosing all of the various advisory reports that had been received up to that time. This appears to be the first occasion when these reports came officially into the Government's hands. The following is an extract from the evidence given by the Monourable E. C. Drury:

- Q.- Them I notice on a copy of the Stuart and Kerbaugh report, it has printed on the face of it that it was to the Honourable C.S. Drury on January 21st, 1921. Does that correspond to your recollection as to the date on which you received the volume containing the Stuart and Kerbaugh report?
- A .- Yes. Here is the covering letter, of January 21st, 1921.
- Then that was the date on which you received the Stuart and Kerbaugh and these reports other than the Cooper report which you had received partier?

A. Tos.

- O.- Then did you have any further discussion with the Commissioners or any of them, or with Mr. Saby, about the total estimated cost, after you received those reports during that session?
- A.- I think not. The matter was then dealt with, I think, by Col. Carmichael. There was the Kerbaugh estimate and the additions to it which were submitted in the estimates to the Notes in 1921.
- the Chief Engineer, in view of certain questions that had been neked in the House as to this estimate of \$55,000,000, and Eradaby had assured him that that would complete it and that he was justified in so informing the House. Did that come to your knowledge at that time?
- A.- Yes, that came to my knowledge through Col. Carmichael. To were naturally very anxious that we should get some finality in the thing and get am estimate that we could rely on, and I had asked Col. Carmichael to assure himself as fully as possible if the estimate submitted to the House would be the final. We knew, of course, it was designed to complete the first five units in the Pall of 1921, and it was very much desired that there should be finality in the estimates.

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- Q .- Then, the estimate was submitted to the Touse, and passed: Col. Carmichael stated to the Legislature that would complete the canal?
- A. Yos.
- Q.- When did it first come to your attention that these estimates were likely to be exceeded?

treety, the last wine producted in a contrader his time them,

- A.— Some time either in the latter end of august, or, I think, more likely in the first part of September of 1921, when Col. Carmichael drew my attention to the fact that he expected the estimates would be exceeded; I remember he first spoke to me with regard to it when coming in a car from Parkdale Station, and I told him at that time I thought he had better pay rather particular attention to it, and see just what the state of the financing was. We were getting very anxious about it at that time because during that year, part of the time, at least, we were providing Warrants to the extent of almost \$1,000,000 a week, and were exceedingly anxious that it should come to an end.
- Q .- Will you tell (a. the party what followed?
- A .- After that Col. Carmichael drew to my attention. I think about the 11th or 12th of October, the fact that he had assured himself that the estimates were being exceeded. I remember that Sir Adam Bock had asked for a conference. I think it was on the evening of October 12th, that the conference was held at which we discussed the submission of radial bylaws in connection with the forthcoming municipal elections. Col. Carmichael had drawn my attention to the fact that he had assured himself the estimates were running, and had run at that time, a great deal beyond the amount they should. having regard to the progress of the work, and I made up my mind that I would use that conference for the purpose of discussing the Chippawa question. In pursuit of that, I notified the members of the Cabinet, and also Col. Carmichael and Mr. Miller, and at that conference I told Sir Adam Beck, before we went into the Council Chamber where the meeting was held, that I had become very much alarmed over the Chippens expenditures, and I proposed that we should get some explanation, as to the state of the work that evening. Sir Adam Book sent for his officials, Mr. Pope and Mr. Gaby. I am nor sure whether any other officials were there, also Mr. Kilmer and we spent the evening discussing the Chippawa expenditures and the over-running of the estimates. There was no detailed explanation at that meeting, but Sir Adam Book promised to give a detailed explanation to me during the next week.
- C.- Did you get it?
- A .- No. it was not forthcoming. There were a number of letters ex-

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changed. I think they are on the file, with Col. Carmichael and Sir Adam Beck.

- q.- Just before we come to these letters, I want to ask you hr. Drury, with regard to a memorandum to Sir Adam Beck by Mr. Gaby, as Chief Engineer, which was produced on Wednesday by Mr. Gaby, and marked Exhibit No. 46 today, the memorandum being dated October 7th, 1921. Have you had an opportunity of looking over that memorandum?
 - A .- Yes, I have looked over this memorandum.
 - G.- Them did you first see that statement?
- A .- When I looked over it the other day; I had never seen it before.
- Q.- That memorandum was not submitted by the Commission to you?
- A. No. amain
- Q.- When did you first learn of the contents, that is in reference to the amounts which it was claimed it had cost to speed up the program, in the detail given in that report?
- A.- That matter was discussed in a general way during the conference of October 12th. I remember it was urged that the speed-up programme was increasing the cost considerably, and in particular it was mentioned that one of the steam shovels was a 'hoodoo', and the discussion centred around the antics of that particular steam shovel. The details of this memorandum were never brought to my attention at all, that I remember.

4775 4776 4777

The memorandum referred to bearing date October 7th, 1921,

(Exhibit 48) is signed by the Chief Engineer and addressed to Sir Adam Book.

The memorandum sets forth in detail a statement of reasons why the estimates were being exceeded. The report lays considerable stress on the inefficiency of employing a night shift and details extra costs due to the rush schedule.

In summing up Mr. Gaby states:

"Two main items which contributed to the failure of these expectations were: (first) the impossibility of making the
night shift operation as efficient as the day operation, and
(second) the unavoidable delay in getting the steam equipment
into operation and its failure to make good as compared with
the electrically driven plant."

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In substance Mr. Caby's memorandum purports to show that the expenditure necessary to complete the Queensten-Chippswa Development for five units based upon conditions existing in May and June, of 1921, with rates revised to those of August, 1921, amounts to \$65,035,810. Mr. Caby states that this memorandum was presented to the Government at the conference of October 12th, but Premier Drury and Col. Carmichael, both present at the conference, state that the memorandum was not presented at that time.

OR RESIDENCE MADE, MINE, PRINCES OF SECURISH STATE AND DESCRIPTION

THEY PURELY VINES. BUT IN LESS AND ADDRESS AND ADDRESS

That the view of this situation, held by Premier Brury and Colonel Carmichael, is correct, appears to be supported by subsequent events.

The Chairman of the Commission had promised the Government that explanations would be forthcoming within a week, but some time elapsed and on Bovember 10th, 1921, the Premier wrote to Colonel Carmichael asking for the report. In this letter Premier Drury status as follows:

"You will further recall the meeting which was arranged between members of the Commission with the Chief Engineer, Er. Gaby, and the full Cubinet, in which the entire situation was very fully discussed and a promise was made by the Commission that a full explanation of the increases would be submitted to the Government in the course of a few days. This explanation has not yet arrived, and the Government is intensely interested. I would urge that you, as representing the Government on the Commission, should immediately take the matter up and see that this

Again in the letter he states:

"You were assured by the Officials of the Commission and in turn assured the Souse and the Country, some seven months ago, that the estimates then submitted to the House for their approval were ample for the completion of the first five units."

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Premier Drury further states that he know at that time, after receiving advice from the Hinister of Public Works, that prices of materials had been considerably reduced, the evidence in this connection being:

Q .- You based that opinion on what?

A.- Upon the fact I had discussed with the Einister of Public Forks the prices of material, in the Roads Department, where they handle a great deal of the same sort of material, and their information was that prices were going down; and labour we know was easier, and the rush schedule had been abandoned."

%v.

On November 29th, 1921, Colonel Carmichael wrote the Chairman of the Commission pointing out that six weeks had elapsed without any explanation being forthcoming in reference to an increase of expanditures over estimates of approximately \$10,000,000. Colonel Carmichael states in part as follows:

"I regret being compelled to think that the matter is not being treated with the consideration which its importance warrants."

24

On December 8th, 1921, Premier Drury wrote to Sir Adam Seck acknowledging receipt of a letter bearing date Movember 30th, in which the Chairman of the Commission had stated that the data and information required could only be computed by three or four particular members of the staff and that these men had been busy on other work, but that they were then preparing the report. In part Mr. Drury's letter reads as follows:

"Let me point out to you again, that what the Government requires is your own explanation, as head of the Cosmission, in fulfilment of your personal promise, to also such an explanation, which is now nearly two months overdue. We are not asking for new and elaborate computations by engineers, but we are asking for the information you must have had be head of the Commission and which justified you in your own mind in asking the Government to exceed, by a sum,

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according to your verbal statement, of approximately ten million dollars, the estimate which we, on your assurance, submitted to the Bouse as final at the last Session
The Covernment desires to assure itself of the defensibility of these expenditures and delay in giving us necessary explanations is hampering the transaction of public business."

D.87

Promier Drury's letter of December 8th, 1921, was acknowledged by the Chairman of the Commission on December 12th, and on December 17th definite figures were submitted. Under this date, the Chairman of the Commission wrote the Premier enclosing further reports from Stuart and Kerbaugh, who had been engaged in the meantime to report upon the increase in cost over and above their first estimate. The report by Messre. Stuart and Kerbaugh is dated December 13th, 1921, and purports to emplain why their estimate of September 13th, 1921, and purports to emplain

The report deals with the subject under various headings.

Referring to the progress of the work they state in part as follows:

"Dospite adverse factors we are of the opinion that had it been necessary to adhere to the original achedule your local staff at Niagara would have made good within a margin of the menth."

Dealing with costs they state as follows:

of the financial boulded in this Land on the body 1951, 202, In your

"Under the head of wholly unforeseen or unknown items. We may specify the following:

1.	Abnormal Accidental Continuoneies Change in Character of the Bock	2,500,000
3.	Coment and Sand	350,000 613,000
4.	Labour Turnover	1.361.487
5.	Miscellaneous Overheads	
9.	SOR BELLEVISION OF THE AND ADDRESS OF THE ADDRESS O	\$7,403,834
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In concluding their report they say:

"From our examination of the facts, we concluded that while the results which your engineers aimed at and worked for may have cost more than they or curselves anticipated. there is no doubt in our minds, that in maintaining the high class of workmanship the extra money was well spent. and that the expenditure as a whole will be vindicated by the availability, in the public interest, of a large quantity of extra power at a price which will ultimately be in substantial agreement with the September, 1920, estimate."

Mr. Drury on being questioned as to his opinion of the letter received by him from the Chairman of the Commission stated as follows: *..... the matter rested there and I was not satisfied"

W. 4786

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THE COMMISSION'S ENTIRATE OF PERSONNEL 10TE, 1922

On Pebruary 8th, 1922, the Prime Minister wrote to the Chairman of the Commission stating that it appeared to him from the request received for appropriations dated February 2nd, that the estimate of \$55.000,000 made in October. 1921, was also being exceeded. The Chairman of the Commission replied to this letter on February 10th, 1922, in great detail, and pointed out that the total estimated cost to complete the work was \$68,965,603.05 from which was to be deducted an estimated salvage value of \$3.500.000 leaving a balance of \$65.365.603.03. This shows only a comparatively small difference between the two estimates, but the estimate of October, 1921, allowed only \$1.500,000 for salvage while the estimate of February, 1922, increased the allowance to \$3,500,000.00. The net difference between the two estimates, on the same basis not allowing for salvage was \$2,329,793.03.

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Premier Drury in referring to the explanation of December 17th, 1921, before referred to, again says:

"I thought, and still think it was an inadequate explanation. In the first place, our information was that the price of materials and labour as indicated in the Public Works department had gone down. The schedule, the rush schedule, had been abandoned, and frankly, looking over the reports of Stuart & Merbaugh, they looked more like excuses than reaons It seemed to me something must be wrong with the estimates of work and material, or this startling discrepancy would not have occurred."

BV . 4788

In writing to the Commission on February 8th, 1922, Premier Drury stated in parts 3

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"In the face of these facts, we are led to one of two conclusions, either that you and your engineers did not fully disclose conditions to the foremment and to the Legislature when submitting your estimates at the last Session, or in the alternative, either you were not informed of conditions and the probable cost of the work as you should have been or that there has been extravagances or inefficiency in its carrying Obe promising that he had never \$4,000,000 per behind the

BOX. p.99

ANALOGOPHICA AND DESCRIPTION OF THE REAL PROPERTY. In connection with the request of the Commission for further moneys for 1922. Mr. Drury in the same letter to the Commission says:

"In this commection I would point out that the requisition before me is not as it professes to be pursuant to Section 248 of the Power Commission Act. Having exhausted the whole of your estimates for the fiscal year ending 31st October next, you are required by this Section to submit a new estimate for the amount now estimated to be required for that year and the Special Warrant must be for 'The amount estimated to be required'. Until this is done the Government has no authority to take any action."

3,100

Pursuant to this on March 3rd, 1922, an interim vote was wubmitted to the Legislature for \$3,500,000 and Colenel Carmichael made a Ot to take he age is statement in the House in reference to his position. It was at that meeting of the Legislature that Colonel Carmichael first made it publicly

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known that he had tendered his resignation as a member of the Commission to the Premier. Colonel Carmichael at that time stated:

"Now, my own position is simply this, that I gave these figures to the House last Spring in good faith. They have been exceeded enormously. When it came to my attention last autum that this estimate was sure to be exceeded I brought that fact to the attention of the Government and told the Prime Minister that my feeling was that the Commission had either been inefficient or had been dishenest in its dealings with the Government in regard to this development. I could not see that any body of men working on construction such as this could not have been fully enough seized with the quantity of work to be done that they should need to exceed their estimates by such an enormous amount of mensy, and I told the Prime Minister that in view of that he was entitled to have my resignation from the Commission as Government representative on the Cormission. I still feel the same way. I cumot see that when an estimate has been exceeded to such an enormous extent - and I want to make this clear, in that estimate of \$29,000,000 which was required to complete the work, at the end of Kant Boation - which had been supplied by a firm of engineers, itewart and Kerbaugh, there was included an amount of \$3,600,000 for contingencies. The chief engineer of the Commission told me later that in recommending that estimate to the Commission for transmission to the Soverment that he had added \$5,000,000 for interest and contingencies and he told me that \$2,800,000 was for interest and \$2,500,000 for contingencies, so that in the estimate which would bring the expenditure up to \$55,000,000 there was included an amount of approximately \$6,000,000 for contingencies. And when we find that the estimate has been exceeded by approximately \$14,000,000 I think I am safe in saying that the 'contingencies' amounted to approximately \$20,000,000. I cannot see that any efficient and honest body of men dealing as they were with the Government should vary or be out so much in their estimate. The paration of the permitted in Lampia

HOE. SAN CLARK: The Minister mentions the sum of \$14,000,000 and \$6,000,000 and then totals them and gets \$20,000,000. Is that contingencies?

HON. MR. CARMICHAEL: I put it like this: In the first estimate given in this Mouse, bringing the estimate up to \$55,000,000 there was \$6,000,000 for contingencies. They exceeded that estimate by \$14,000,000 making \$20,000,000 in all. I think it is fair to say that that would be an amount of \$20,000,000 for contingencies. I have felt my position so keenly that I

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have not only several times verbally expressed to the Frime Kinister my feeling that I should resign from the Commission, but I have today put that in writing and I have today given the Prime Minister my resignation in writing from the Commission. I feel that the Government has not been treated as it should have in advancing money for the completion of this work.

Own time to time and the matters of the affiliar above, he lies by the regions.

Mr. Drury, on being questioned as to what finally took place, and when asked if any further explanation had been received other than that obtained in letters already mentioned from the Chairman of the Commission, replied:

- A -- No. I have received no Arther explanation.
- Q.- What action did the Government then take on the situation?
- A.- We then considered the appointing of a Commission to inquire into the matter. As you are aware the matter was under discussion in the House for some time and it was first suggested that we should use a Committee of the House to make an inquiry. On thinking the matter over I came to the conclusion such a Committee could not function properly; we could not get men of the proper standing and qualifications, and it would be better to investigate by Boyal Commission, than by a Committee of the House; the appointment of the Commission followed.

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PART VIII - APPROPRIATIONS

Section 35

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APPROPRIATIONS

particularly with the estimates that were prepared by the Commission from time to time and the nature of the advice given to the Sovernment. We have shown that, while the costs were being constantly exceeded, the Sovernment was left almost completely unadvised of the fact, except on those occasions when it became alarmed at the expenditures made by the Commission as compared with the estimates in its hands and demanded explanations from the Commission as to the true state of affairs.

practice the estimates would form the basis on which the Government advanced funds to defray the cost of the work, and that the Commission would each year make an effort to present to the Legislature, estimates which would fairly represent the cost of the work for each period them under consideration. That this was the intention of the Legislature when the Commission was authorised by Statute to proceed with the work is clearly the case.

The Queenston-Chippewa Power Development was and is being constructed under the provisions of the so-called Development Acts, viz: The Ontario Niagara Development Act (1916, Chapter 20) and the Ontario Niagara Development Act (1917, Chapter 21). There is not in either of these Acts a section which is frequently found in similar acts providing that the

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general provisions of the Power Commission ast shall apply to works constructed under the provisions of the Development acts except to the extent to which such general provisions are inconsistent with the special provisions of the Development Acts. Accordingly, it must be understood that the provisions of the Power Commission Act apply to such works to the extent to which they are specifically made applicable, and none of the provisions of the Power Commission Act relating to the defrayment of the costs of such works are declared applicable to such works. The conclusion reached, therefore, is that none of the authorities contained in the Power Commission Act are available to the construction of the Queenston-Chippawa Power Development and that one must look to the provisions of the Development Acts themselves for the authority for the financing of that work.

The only scripe in either of the Development Acts relating to the financing of the construction of the Queenston-Chippawa Power Development is Section 4 of the Act of 1916 which reads as follows:

- "4.-(1) The cost of the construction and maintenance of the works authorized by this act shall be defrayed out of such money as may, from time to time, be appropriated by the legislature for that purpose, and the works which may be anthorized under section S shall be carried out and constructed as far as possible in such a manner that an appropriation made in any one fiscal year shall not be exceeded by the cost of the work to be carried out in that year.
- (2) The Government may direct the Treasurer of Omtario
 from time to time to pay over to the Commission out of such
 sums, any sums which may be required to defray the cost of
 the works carried on by the Commission under this Act, and
 all such sums shall be duly accounted for as hereinafter
 provided. 6 Goo.T. c.20, p.4."

geotion 5 proceeds to make special provision for the manner in which the Commission is to account for sums advanced by it to the Treasurer of Ontario for the purposes of works constructed under the Act. and Section 5 of the Act of 1917 sets cut the manner in which the costs

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of the works are to be borne by the municipalities. The only authority, however, for the advances of money by the Province to the Commission is that contained in Section 4 quoted above.

The table included herewith as page 218 slows the appropriations, advances in respect thereof, advances under Special Warrants and Treasury Board Minutes, and the expenditures in connection with the construction of the Queenston-Chippawa Power Development from the first appropriation in 1917 until the close of the fiscal year ending October 31st, 1922.

apparent that up to October 31st, 1922, the Legislature had appropriated in all \$66,875,000 for the propert of the Queenston-Chippawa Power Development. The advances in respect of these appropriations total \$49,032,871, or \$7,842,129 less than the total appropriations, but during the same period the Province advanced \$12,245,675 under Special Marrants and Treasury Board Minutes or \$4,403,546 in excess of the Legislative appropriation. The total advances by the Province to the Commission amount to \$61,276,546, and the total expenditures to \$65,642,616, so that the total expenditures exceed the total advances by \$4,364,070.

To complete a review of the appropriations, advances and expenditures with respect to the Queenston-Chippawa Power Development, certain important features should be noted.

Special Warrants and Appropriations

The first feature is that in only one year (1921) did the Province advance the full amount of the Legislative appropriation to the

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HYDRO-RIBOTRIC POWER COMMISSION

Appropriations, Advances and Expenditures in connection with the construction of the Queenston-Chippawa.

Power Development

parameter had been been as the finding from the parameter. At the case of the

Year	Legislative Appro- priations	Advances out of Appro- priations	Advances Under Special Warrants and Treasury Board Ninutes	Total Advances	Expendi-	Over- Expended (Under- Expended)
To Oct. 31/17	\$ 1,500,000	\$ 1,200,000	*	\$ 1,200,000	\$ 2,376,790	\$1,176,790
Fiscal Yr.1910	4,175,000	3,140,000	735,000	3,675,000	5,174,161	1,299,181
1919	6,000,000	3,540,000	2,460,000	6,000,000	7,162,999	1,162,999
1920	10,500,000	7,285,000	4,000,000	11,285,000	12,132,926	647,926
1921	26,700,000	26,700,000	3,960,675	50,680,675	31,171,471	490,796
1922	8,000,000	7.167.671	1,070,000	6,257,871	7,624,249	(613,622)
Totals -	\$56,875,000	\$49,032,871	\$12,245,675	\$61,278,546	\$65,642,616	\$4,364,070

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Commission, but in every year subsequent to 1917 the Province advanced miscellaneous sums totalling \$12,245,675 under Special Warrants and Treasury Board Minutes with the result that in the last three years the total advances from the Province to the Commission exceeded the Legis-lative appropriations by over \$5,000,000.

Application of Section 24b

The second feature is the dubicus authority of the Province to advance any money to the Commission under Special Warrant for the purposes of the Queenston-Chippawa Power Davelopment. It has been pointed out that Section 4 of the Act of 1916 is the only authority for the advance of money by the Province to the Commission for the purposes of this work. There is nothing in this provision to authorize the issue of Special Warrants and it is difficult to conceive that the provisions of Section 24b of the Power Commission Act can be considered applicable. There is no doubt, of course, that the Commission considered that, when Section 24b was enacted in 1920, it was available for the purpose of securing funds for the purpose of the Queenston-Chippawa Power Development because the correspondence between the Chairman of the Commission and the Prime Hinister contain specific requests on the part of the former that the sums be advanced pursuant to the provisions of Section 24b.

It is to be noted that, while Section 24b authorizes the issue of so-called "Special Warrants" when an appropriation has proved insufficient in any fiscal year, the Audit Act provided for the issue of

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"Special Warrants" only in emergencies for undertakings in respect of which there is no appropriation. Accordingly we understand that all requests for advances under Section 2th are met, not by Special Warrants, but by what are called Treasury Board Minutes, commonly employed under the Audit Act when appropriations have become exhausted.

Strict compliance with the terms of Section 24b under which the requests of the Commission were made would have required the issue of Special Warrants. For the passage of Treasury Board Minutes no application by the Commission under the Section was necessary. Liberal appropriations were passed by the Legislature in 1920, 1921 and 1922 and yet during that three-year period almost \$69,000,000, or ever 20% of the aggregate appropriations for that three-year period, was advanced by the Government under Special Warrants or Treasury Board Minutes. Circumstances cannot but suggest that the Section was passed at the suggestion of the Commission with the intention that it should be available for the Queenston-Chippawa Power Development when the appropriations by the Legislature had been enhanced.

Nethod of requesting Appropriations

Included herewith as page 225 is a table showing the particulars of the Legislative appropriations passed for the Queenston-Chippawa Power Development during the Sessions 1916 to 1922, inclusive. This table shows what moneys were passed by way of Main Estimates, what moneys by way of Supplementary Estimates and in the form of Further Supplementary Satimates. It also shows in the "Remarks" column the description of the item or vote as it appears in the various Estimates.

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It is to be noted that prior to 1920 no appropriations were passed in the form of Main Estimates. It is unnecessary to comment here on the usual practice of Government Departments or Commissions as to the submission of Main Estimates, at one session, of the expanditure contemplated in the next following fiscal year.

It is to be further noted that throughout the entire seven-year period less then \$6,000,000 was voted in the form of Main Estimates, and the balance (almost \$51,000,000) was voted as Supplementary Matimates or Further Supplementary Matimates.

The effect of the policy of the Commission of requesting funds in the form of Supplementary Istimates and Further Supplementary Betimates indicates in the first place that it did not see its way clear to estimate its expenditures for the next following fiscal year, with the result that in many cases the current fiscal year for which the appropriations were requested had sometimes as much as half elapsed before the Estimates were submitted to the Legislature. This practice, no doubt, accounts for the large number of Special Warrants and Treasury Board Minutes requested by the Commission prior to the opening of the annual sessions.

Special attention is directed to the manner in which the Commission prior to 1920 requested all its appropriations, with the exception of \$500,000 in the year 1916, in the form of Further Supplementary Batimates. It is sufficient in this commection to point out that in the first place it is unusual to vote large sums of money in the form of Further Supple-

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with the process to seek and the process of an expension of an expension of all the sections and the section of the section of

mentary Estimates, and secondly, that the further Supplementary Estimates are invariably brought down in the house after the Supplementary Hatimates have been disposed of with the result that, at the 1922 Session, which lasted almost 120 days, less than 20 days were available for the consideration of the Further Supplementary Estimates.

Finally, it is to be noted that prior to 1921 the only description of the appropriations passed by the Legislature was simply "Queenston-Chippewa Development" or "Niagara Power Development" or some similar general expression. Beginning with the Session of 1922, the various items making up the vote have been described in considerable COPY

Relations between Government and Commission

The year 1920 may be said to be the first year that the Government had occasion to feel any great slars regarding the cost of the work, and as we have pointed out this advice came to them not through the Commission, but through the medium of the Government Auditor, Mr. G. T. Clarkson, when he stated in his report for the year ending October Slat, 1919, that the cost to complete the work would be about \$40,000,000, Thus, we see a new Government coming into office at the beginning of the fiscal year 1920, when almost \$15,000,000 out of a total estimated cost of \$25,000,000 had been expended on the work. Before June 1920 it had been requested to present to the Legislature and did present estimates calling for appropriations of \$15,000,000 for use prior to March 31st, 1921; in other words, over \$5,000,000 in excess of the latest estimate submitted by the Commission to the Government at that time.

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In order to comprehend the nature of the relations existing between the Covernment and the Commission, it is interesting to note that within seven days of the close of the fiscal year, on October 24th, 1920, the Treasurer of the Commission wrote the Provincial Treasurer enclosing

"revised estimate of monies required for the fiscal year ending on the 31st October 1920 in accordance with the 1920 normalment of the Power Commission Act, Section 4, Sub-section 24b, and am enclosing two requisitions, one for \$1,000,000 and the other for \$962,500, and should be very much obliged if you will send the Cosmission cheques for the above amount on dates specified in the requisitions."

The relationship existing between the Commission and the Government may again be illustrated by referring to correspondence. The Session of 1921 opened on January 25th. 19 Junuary 21st, 1921, just four days before, Mr. Lucas, acting Chairman of the Commission, wrote Mr. Drury advising that in addition to the \$5,000,000 voted at the Session of 1920, for the five months' period ending March Slat, 1921, the Commission would require an additional \$7,500,000 and requested that this amount be advanced under Special Warrant pursuant to Section 24b and concluded with the remark:

"I beg to call your attention to the necessity of passing the Treasury Board order before the House meets."

This request was not complied with, but on January 27th, we find a further estimate for funds for inclusion in the Further Supplementary Estimates in the amount of \$14,200,000. The first request was apparently added to the second for Vote 201 shows that an amount of \$21,700,000 was voted.

The Main Estimates submitted at the same session included the sum of \$676,798 for the work. Inasmuch as it was necessary to vote pot Later made paid and an implication of the designs of material of the later and additional and the paid of the paid of the later and the analysis of the later and the

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a further \$7,123,102, at the ensuing session of the same period, it is difficult to understand why the main estimates were ever submitted at all, seeing that they represented less than 16% of the amount subsequently requested and appropriated for that period.

It was about this time that the Honoureble Mr. Drury eays he first learned from Colonel Carmichael that the estimates submitted at the session earlier in the year were likely to be exceeded. It is to be remembered that the report of Messrs. Stuart and Kerbaugh had been presented in the meantime to the Government by the Commission. It was also about this time that Mr. Caby states that a memorandum was presented to the Covernment showing that the expenditure would be about \$65,000,000. As pointed out, Mr. Brury and Colonel Carmichael both denied ever having received or seen this memorandum previous to the date when they were enamined by this Commission, and it was not until December 17th, 1921, that the Chairman of the Commission after repeated requests from the Premier informed the Government that the previous estimates would be exceeded by \$11,000,000. bringing the total expenditure up to approximately \$65,000,000.

It was shortly after this time in April, 1922, that the Government appointed the Hydro-Electric Inquiry Commission to investigate all matters relating to the construction of the Queenston-Chippawa Power Development and other matters concerning the activities of the Hydro-Electric Power Commission.

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SESSION	TOTAL ATTROFTIACIONS For Year end-			HAIN SSVINATES		SULTE OF ATTACK		FUNDED AND LEVEL WEARY			REMARKS
	Amount	ing Oct. 31	Amount	ing Oct. 31	Amount	For Year er		For Year end- ing Cot. 31	YOTE	ITEM	Description of Item in Vote.
1916	\$ 500,000	1916	1.00	* 27 (800,000	1916			223	,9	"For Power Development, Hingara ma Queenston, to be expended as may i directed by Lieutenant-Governor in Gouncil."
1917	1,000,000	1917	~	**	-	-	\$ 1,000,000	1917	254	1	"Niagara Power Development"
1918	4,175,000	1918	-	~	-	-	4,175,000	1918	241	1	"Hiagara Power Development"
1919	6,000,000	1919	-	-	-	-	4,000,000	1919	246	20	"Queenston-Chippewa Development"
1920	10,509,000	1920	\$5,000, 00 0	For 5 months ending Nev. 1, 1920, to Mar. 31, 1921	-	eq ex	10,500,000	1920	262 106	10	"Quoenston-Chippess Development" "Quoenston Development"
1921	26,700,000	1921	676,798	3922	21,700,000	1921		. 2	201 113	1 2	"(moonston-Chippawa Development"
1922	8,000,000	1922	2 4		3,500,000	1982	5,623,202	1922	118	102	(x) (z)
	\$6,875,000		√5,876,798	j	25,700,000		J25, 298, 202		-		

(1) Electrical Generation . . . 3876, 798.00 Completion of payments on contracts for five main generators, two ser-Vice units. Generation's chare of switching equipment, reactors. cranes; proportion of station to be constructed this year. (2) Hearmlie Construction . . 800,000.00 Completion of payments covering cost of emaration on the canal and Chippensa River, including intake at Chippenn, the Welland River Canal, forebay, sereen house, penstecks, power house. hydraulic mehinery, right-of-war. miscellaneous highway and railway bridges, together with necesmary equipment for the installation of five turbines of 55,000 HP espacity and accessories

(Y) - Queenston-Chippens Development . . \$5,500,000.00 main generators, two service units, Generation's share of switching equipment, reactors, oranes: proportion of station to be constructed this year

(additional to Vote 113. Item 1. sub-item 1 }-(2) Hydraulis Construction . 2,887,000.00 Payments covering cost of cocavation on the Camal and Chippawa River, Welland River Canal, forebay, soreen-house, penstocks, power house substructure, hydraulic machinery, right-of-way. miscel lancous highway and rai heay bridges, etc. for installation of five turbines of 55,000 HP capacity....

(S) - Queensten-Chippens Development . . \$3,623,202.00 [1] Electrical Generation . . 1.510,202.00 additional payants to be due on contracts for five main generating and two service units, also on switching, service and mechanical equipment for screen house superstructure, and the development's share of the generating station superstructure to be constructed this year. (2) Hydraulis 2,115,000.00 Payments covering cost of excavation on earth section of Canal and Chippens River, inoluding intake at Chippens, acreen house, penstocks, power house. hydraulic machinery, etc.... for installation of five turbines of 55,000 HP capacity

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